Fig.1

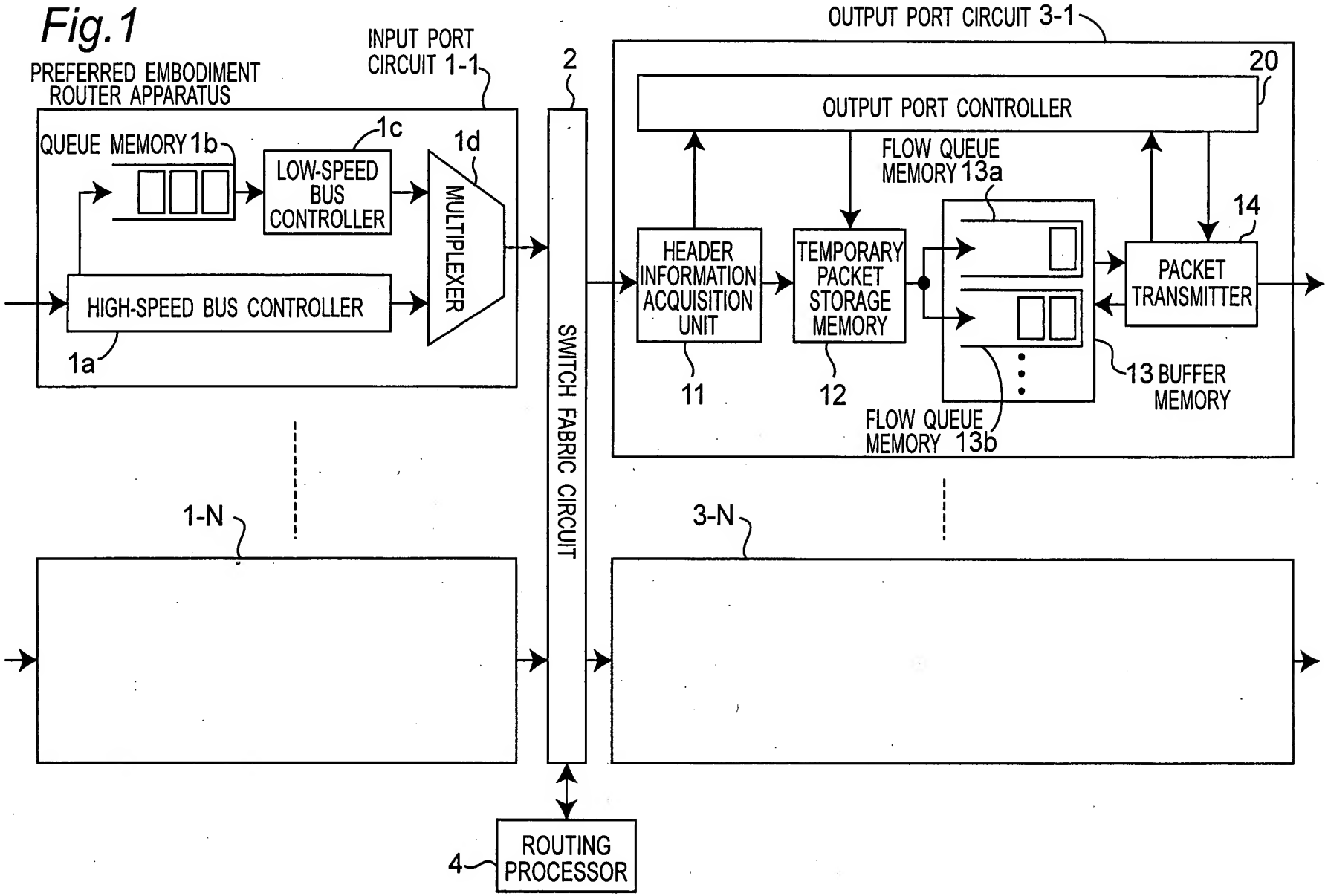
PREFERRED EMBODIMENT
ROUTER APPARATUS
INPUT PORT
CIRCUIT 1-1
2
OUTPUT PORT CIRCUIT 3-1
20
OUTPUT PORT CONTROLLER
QUEUE MEMORY 1b
1c
LOW-SPEED
BUS
CONTROLLER
1d
MULTIPLEXER
FLOW QUEUE
MEMORY 13a
14
HEADER
INFORMATION
ACQUISITION
UNIT
TEMPORARY
PACKET
STORAGE
MEMORY
PACKET
TRANSMITTER
HIGH-SPEED BUS CONTROLLER
1a
11
12
13 BUFFER
MEMORY
FLOW QUEUE
MEMORY 13b
SWITCH FABRIC CIRCUIT
1-N
3-N
4
ROUTING
PROCESSOR

Fig.2

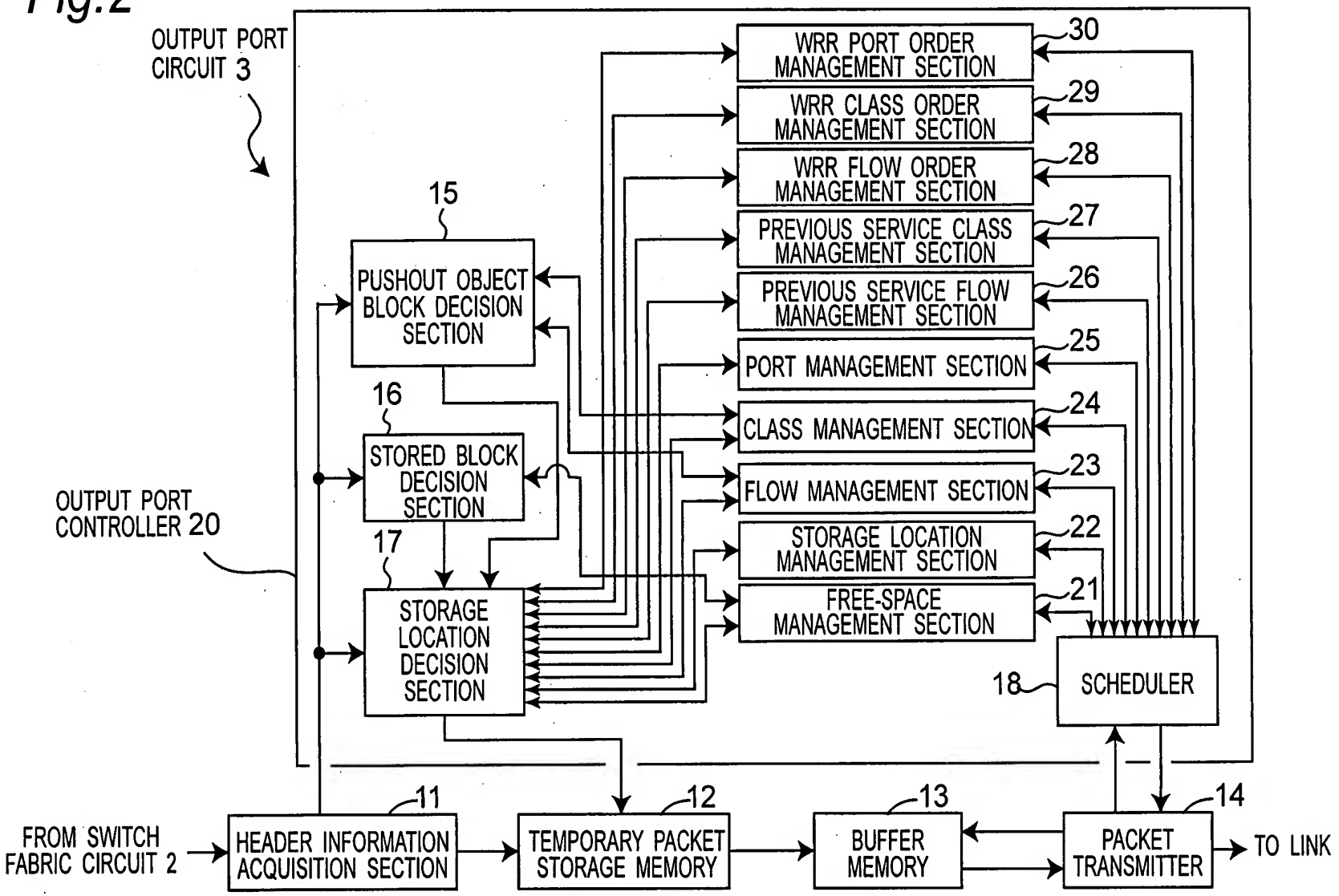
OUTPUT PORT CIRCUIT 3
WRR PORT ORDER MANAGEMENT SECTION
30
WRR CLASS ORDER MANAGEMENT SECTION
29
WRR FLOW ORDER MANAGEMENT SECTION
28
PREVIOUS SERVICE CLASS MANAGEMENT SECTION
27
PREVIOUS SERVICE FLOW MANAGEMENT SECTION
26
PORT MANAGEMENT SECTION
25
CLASS MANAGEMENT SECTION
24
FLOW MANAGEMENT SECTION
23
STORAGE LOCATION MANAGEMENT SECTION
22
FREE-SPACE MANAGEMENT SECTION
21
15
PUSHOUT OBJECT BLOCK DECISION SECTION
16
STORED BLOCK DECISION SECTION
17
STORAGE LOCATION DECISION SECTION
OUTPUT PORT CONTROLLER 20
18
SCHEDULER
FROM SWITCH FABRIC CIRCUIT 2
11
HEADER INFORMATION ACQUISITION SECTION
12
TEMPORARY PACKET STORAGE MEMORY
13
BUFFER MEMORY
14
PACKET TRANSMITTER
TO LINK

Fig.3A

ARRIVED PACKET

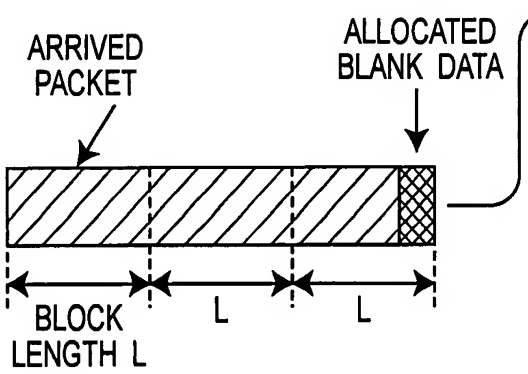

Fig.3B

MEMORY SPACE OF BUFFER MEMORY 13

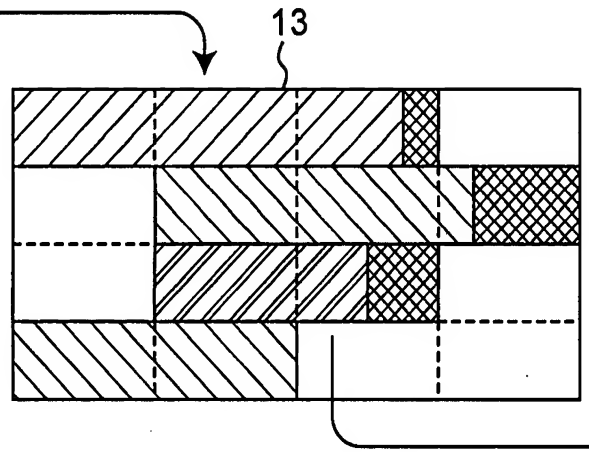

Fig.3C

TRANSMITTED PACKET

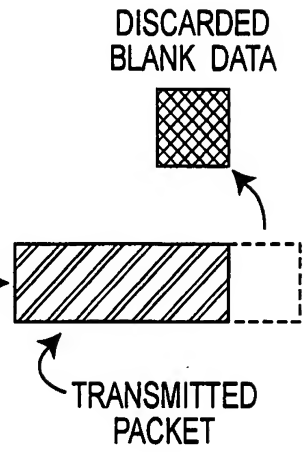

Fig.4

FREE-SPACE MANAGEMENT TABLE T1

BLOCK NUMBER	NEXT BLOCK NUMBER
1	-1
2	3
3	5
4	-1

Fig.5

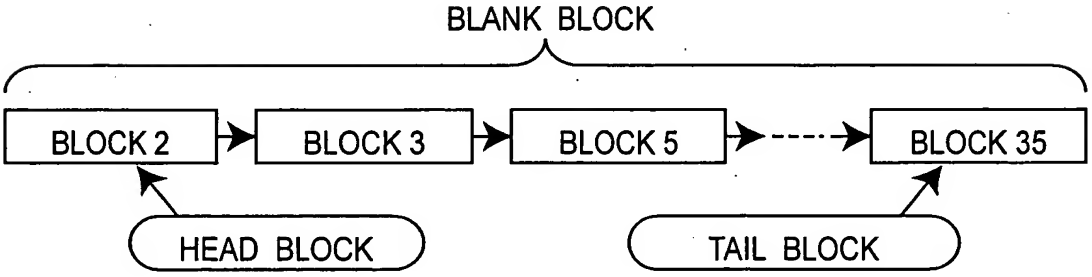

Fig.6

STORAGE LOCATION MANAGEMENT TABLE T2

BLOCK NUMBER	NEXT BLOCK NUMBER
1	3
2	5
3	8
4	-1
⋮	⋮
8	-1

Fig.7

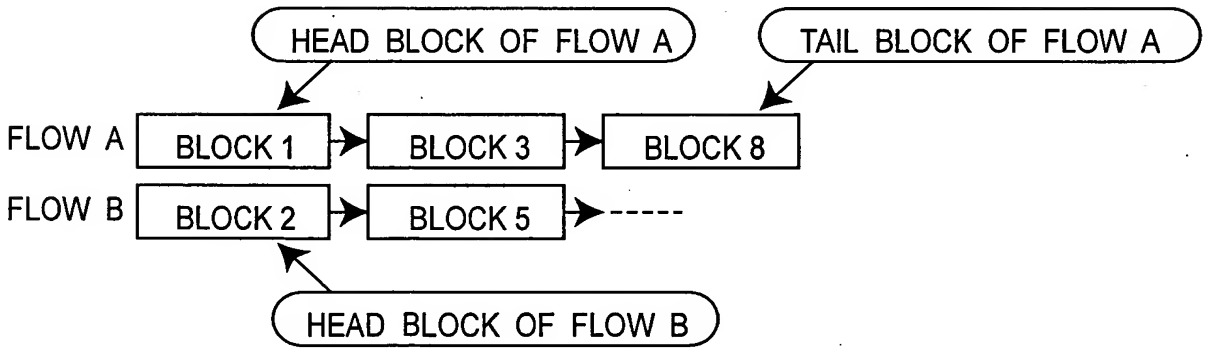

Fig.8

FLOW MANAGEMENT TABLE T3 FOR FLOWS BELONGING TO BANDWIDTH-GUARANTEED CLASS

FLOW ID	BASIC VOLUME	USED VOLUME	HEAD BLOCK NUMBER	TAIL BLOCK NUMBER	PRIORITY
1	16	20	3	38	2
2	8	4	19	8	4
3	16	10	11	24	1

Fig.9

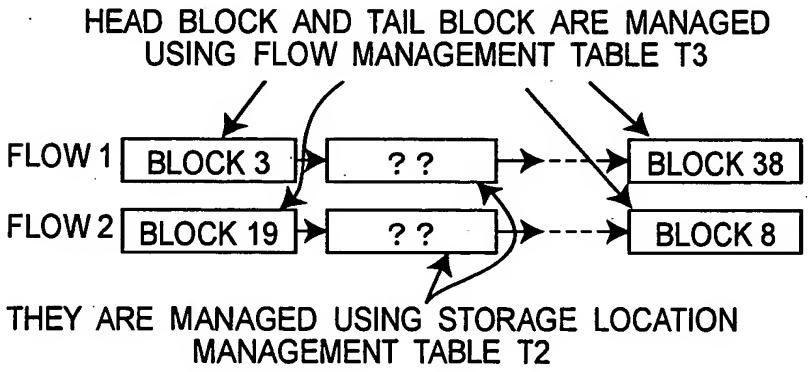

Fig.10

CLASS MANAGEMENT TABLE T4

FLOW ID	BASIC VOLUME	USED VOLUME	NUMBER OF FLOWS	PRIORITY
0	32	28	4	10
1	16	20	6	12
2	10	25	10	10

Fig.11

PORT MANAGEMENT TABLE T5

FLOW ID	BASIC VOLUME	USED VOLUME	NUMBER OF CLASSES	PRIORITY
0	40	31	2	4
1	30	20	3	3
2	20	25	1	2

Fig.12

WRR FLOW ORDER MANAGEMENT TABLE T6

FLOW ID	NEXT SERVICE FLOW ID
1	3
2	5
3	4
4	1

Fig.13

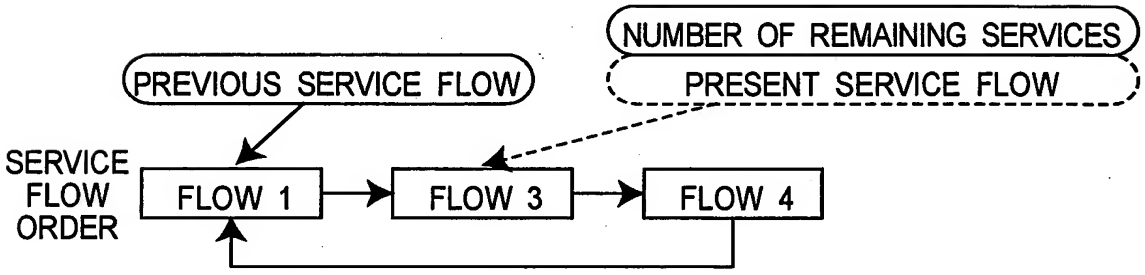

Fig.14

PREVIOUS SERVICE FLOW MANAGEMENT TABLE T7

CLASS ID	PREVIOUS SERVICE FLOW ID	NUMBER OF SERVICES HAVING REMAINING FLOWS
0	3	2
1	5	3
2	8	6

Fig.15A

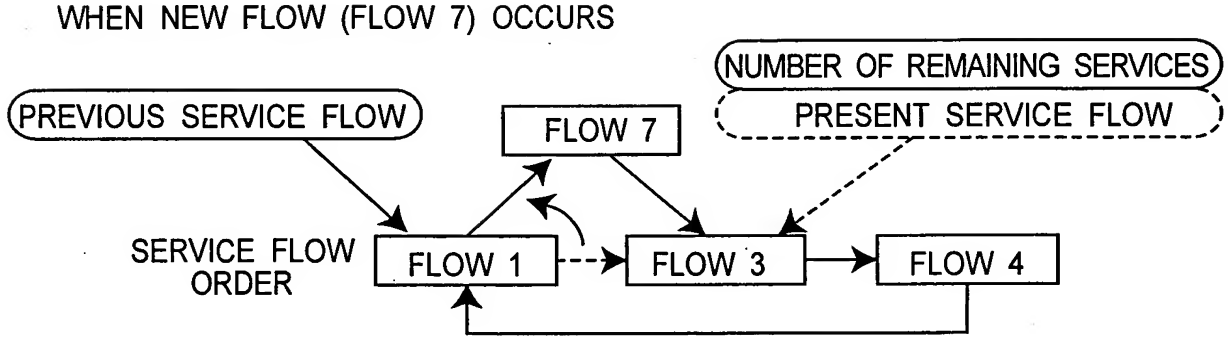

Fig.15B

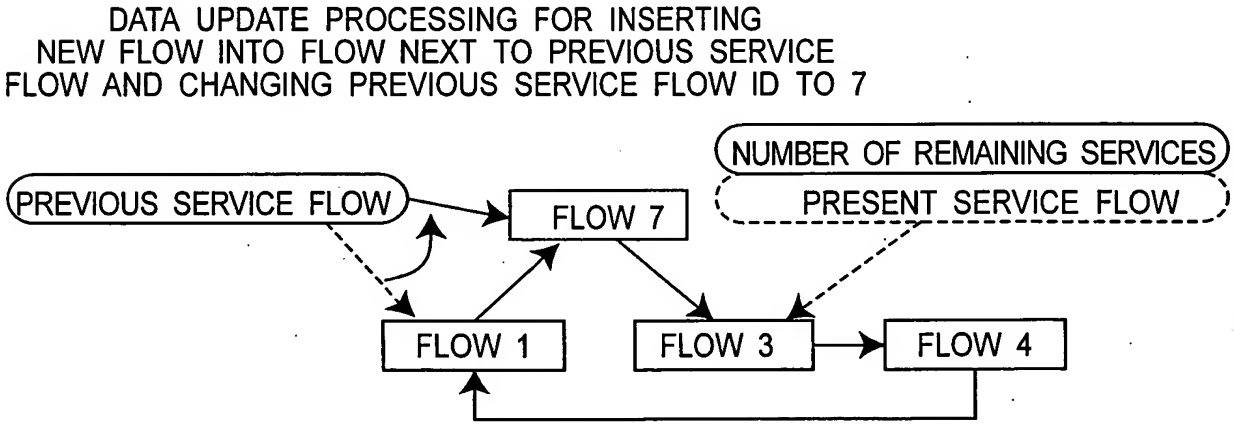

Fig.16

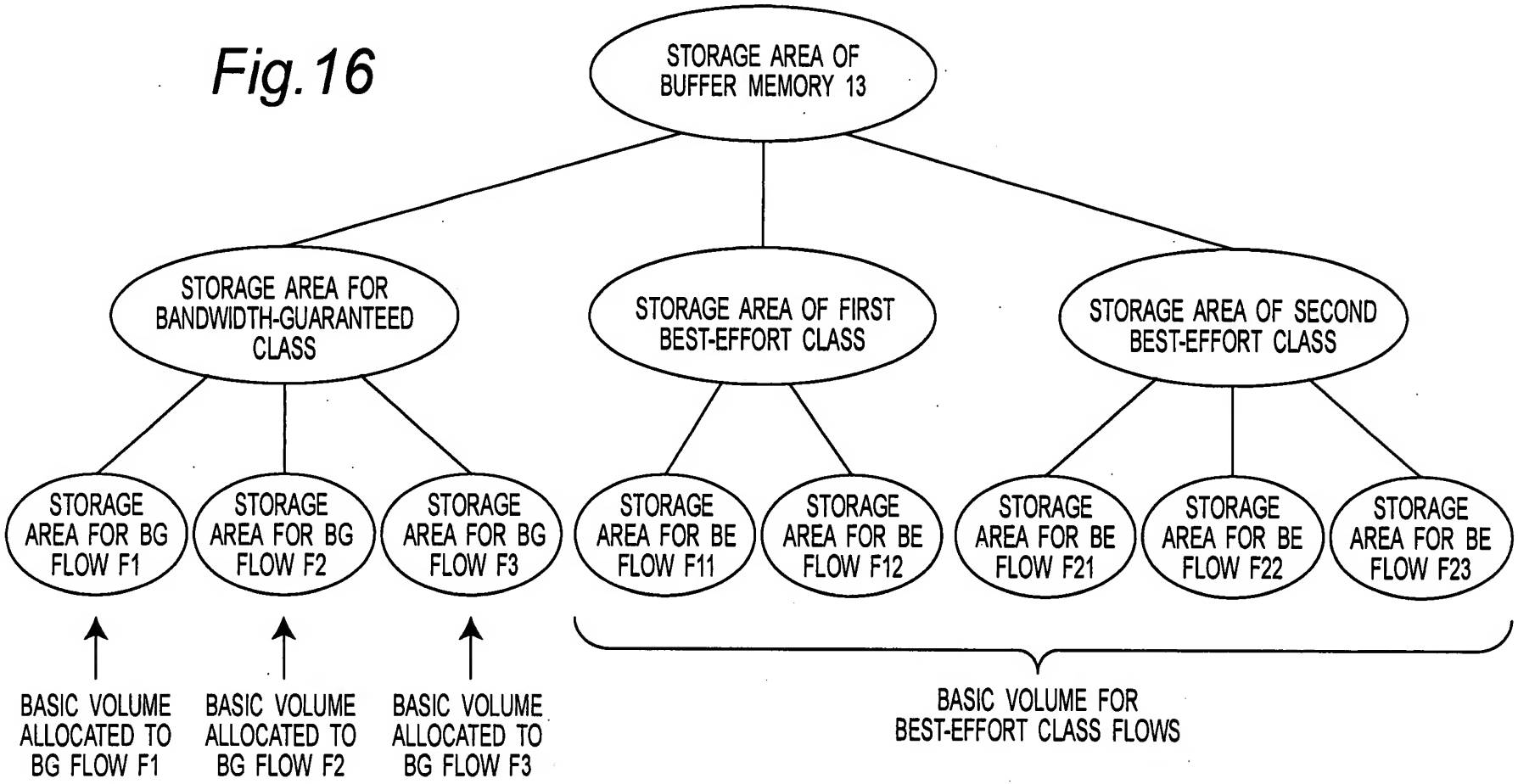
STORAGE AREA OF BUFFER MEMORY 13
STORAGE AREA FOR BANDWIDTH-GUARANTEED CLASS
STORAGE AREA OF FIRST BEST-EFFORT CLASS
STORAGE AREA OF SECOND BEST-EFFORT CLASS
STORAGE AREA FOR BG FLOW F1
STORAGE AREA FOR BG FLOW F2
STORAGE AREA FOR BG FLOW F3
STORAGE AREA FOR BE FLOW F11
STORAGE AREA FOR BE FLOW F12
STORAGE AREA FOR BE FLOW F21
STORAGE AREA FOR BE FLOW F22
STORAGE AREA FOR BE FLOW F23
BASIC VOLUME ALLOCATED TO BG FLOW F1
BASIC VOLUME ALLOCATED TO BG FLOW F2
BASIC VOLUME ALLOCATED TO BG FLOW F3
BASIC VOLUME FOR BEST-EFFORT CLASS FLOWS

Fig.17

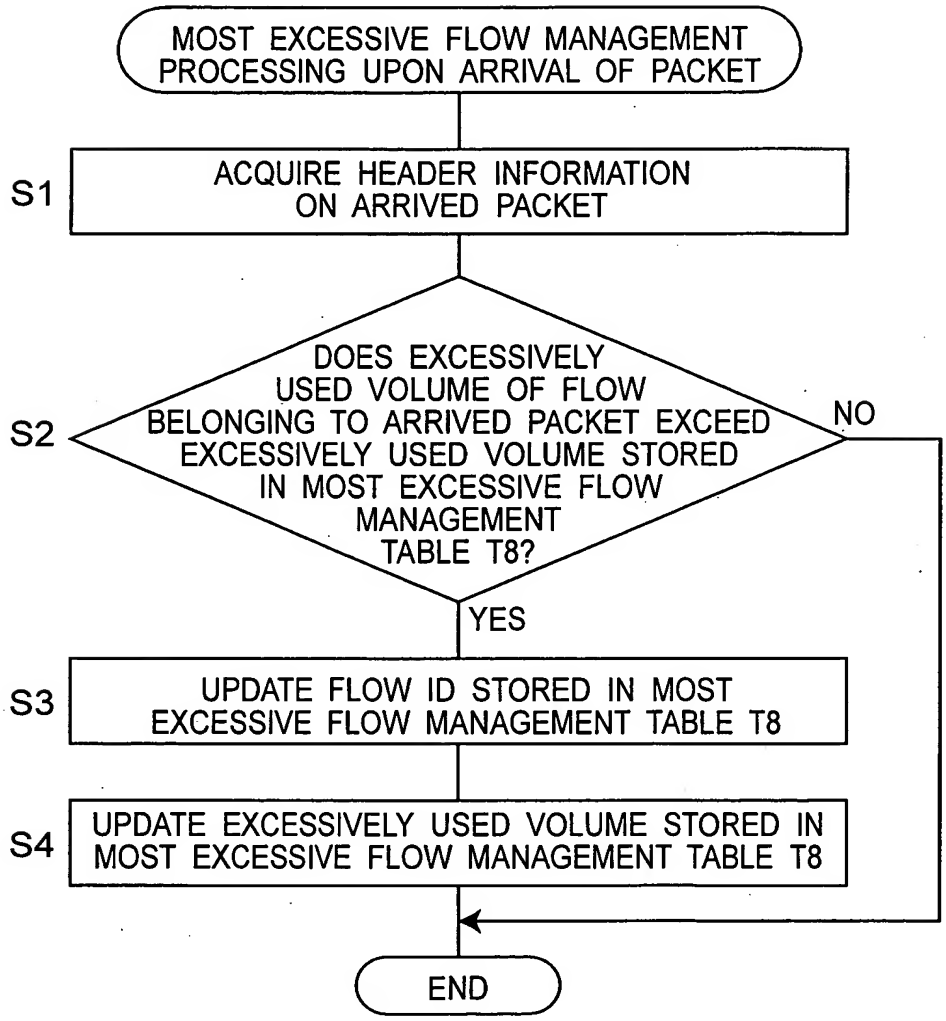
MOST EXCESSIVE FLOW MANAGEMENT PROCESSING UPON ARRIVAL OF PACKET
S1
ACQUIRE HEADER INFORMATION ON ARRIVED PACKET
S2
DOES EXCESSIVELY USED VOLUME OF FLOW BELONGING TO ARRIVED PACKET EXCEED EXCESSIVELY USED VOLUME STORED IN MOST EXCESSIVE FLOW MANAGEMENT TABLE T8?
NO
YES
S3
UPDATE FLOW ID STORED IN MOST EXCESSIVE FLOW MANAGEMENT TABLE T8
S4
UPDATE EXCESSIVELY USED VOLUME STORED IN MOST EXCESSIVE FLOW MANAGEMENT TABLE T8
END

Fig. 18

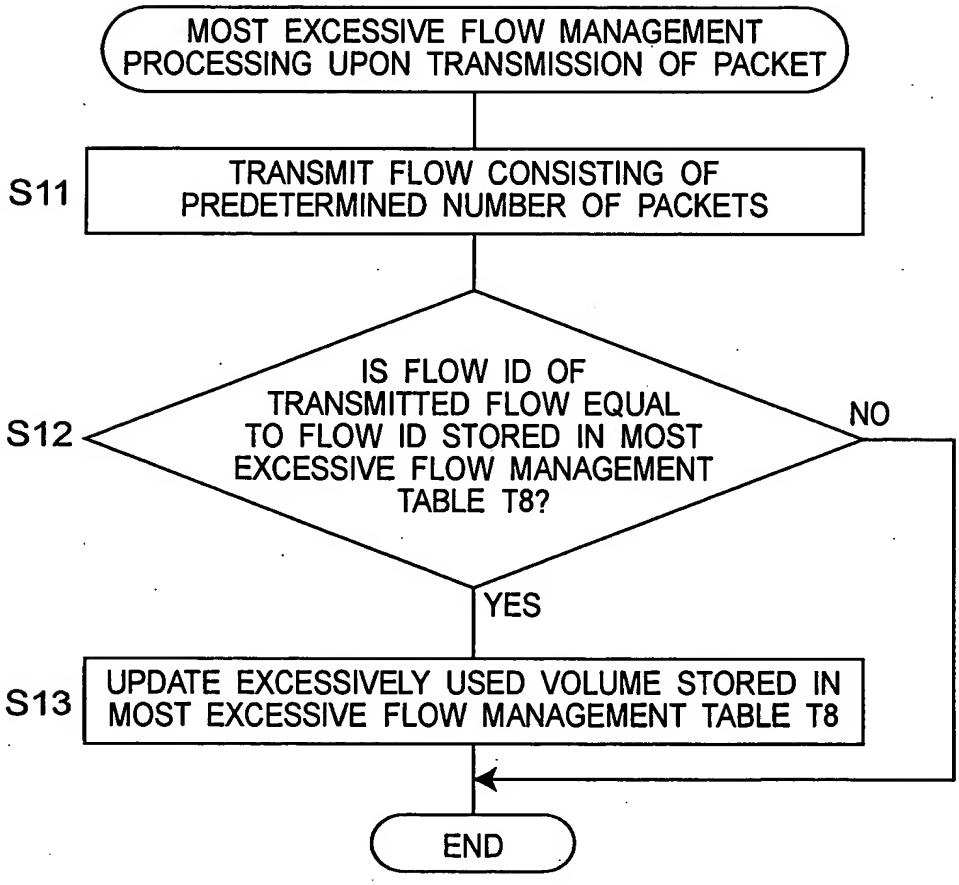
MOST EXCESSIVE FLOW MANAGEMENT PROCESSING UPON TRANSMISSION OF PACKET
S11
TRANSMIT FLOW CONSISTING OF PREDETERMINED NUMBER OF PACKETS
S12
IS FLOW ID OF TRANSMITTED FLOW EQUAL TO FLOW ID STORED IN MOST EXCESSIVE FLOW MANAGEMENT TABLE T8?
NO
YES
S13
UPDATE EXCESSIVELY USED VOLUME STORED IN MOST EXCESSIVE FLOW MANAGEMENT TABLE T8
END

Fig.19A

ONE EXAMPLE OF MOST EXCESSIVE FLOW MANAGEMENT

INITIAL STATE

(a1) MOST EXCESSIVE FLOW MANAGEMENT TABLE T8

FLOW ID	EXCESSIVELY USED VOLUME
1	12

(a2) PRESENT STATE (CALCULATED VALUE)

FLOW ID	EXCESSIVELY USED VOLUME
1	12
2	0
3	11

Fig.19B

WHEN FLOW 3 HAVING PACKET SIZE OF 2 ARRIVES

(b1) MOST EXCESSIVE FLOW MANAGEMENT TABLE T8

FLOW ID	EXCESSIVELY USED VOLUME
3	13

(b2) PRESENT STATE (CALCULATED VALUE)

FLOW ID	EXCESSIVELY USED VOLUME
1	12
2	0
3	13

Fig.19C

WHEN FLOW 3 HAVING PACKET SIZE OF 2 ARRIVES

(c1) MOST EXCESSIVE FLOW MANAGEMENT TABLE T8

FLOW ID	EXCESSIVELY USED VOLUME
3	11

(c2) PRESENT STATE (CALCULATED VALUE)

FLOW ID	EXCESSIVELY USED VOLUME
1	12
2	0
3	11

Fig.19D

WHEN FLOW 1 HAVING PACKET SIZE OF 2 ARRIVES

(d1) MOST EXCESSIVE FLOW MANAGEMENT TABLE T8

FLOW ID	EXCESSIVELY USED VOLUME
1	14

(d2) PRESENT STATE (CALCULATED VALUE)

FLOW ID	EXCESSIVELY USED VOLUME
1	14
2	0
3	11

Fig.20

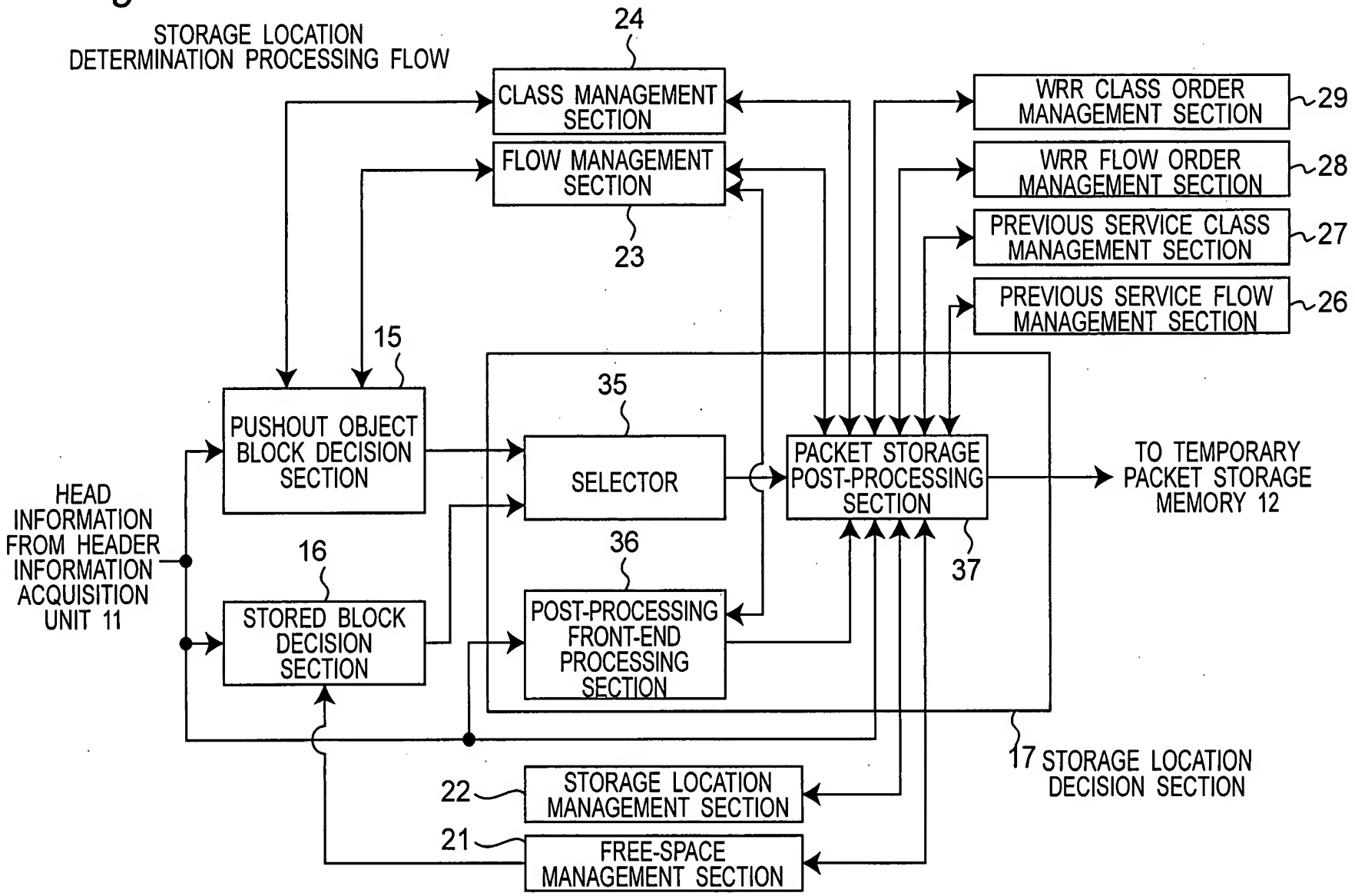
STORAGE LOCATION DETERMINATION PROCESSING FLOW
24
CLASS MANAGEMENT SECTION
FLOW MANAGEMENT SECTION
23
WRR CLASS ORDER MANAGEMENT SECTION
29
WRR FLOW ORDER MANAGEMENT SECTION
28
PREVIOUS SERVICE CLASS MANAGEMENT SECTION
27
PREVIOUS SERVICE FLOW MANAGEMENT SECTION
26
15
35
PUSHOUT OBJECT BLOCK DECISION SECTION
SELECTOR
PACKET STORAGE POST-PROCESSING SECTION
TO TEMPORARY PACKET STORAGE MEMORY 12
HEAD INFORMATION FROM HEADER INFORMATION ACQUISITION UNIT 11
16
36
37
STORED BLOCK DECISION SECTION
POST-PROCESSING FRONT-END PROCESSING SECTION
17 STORAGE LOCATION DECISION SECTION
22
STORAGE LOCATION MANAGEMENT SECTION
21
FREE-SPACE MANAGEMENT SECTION

Fig.21

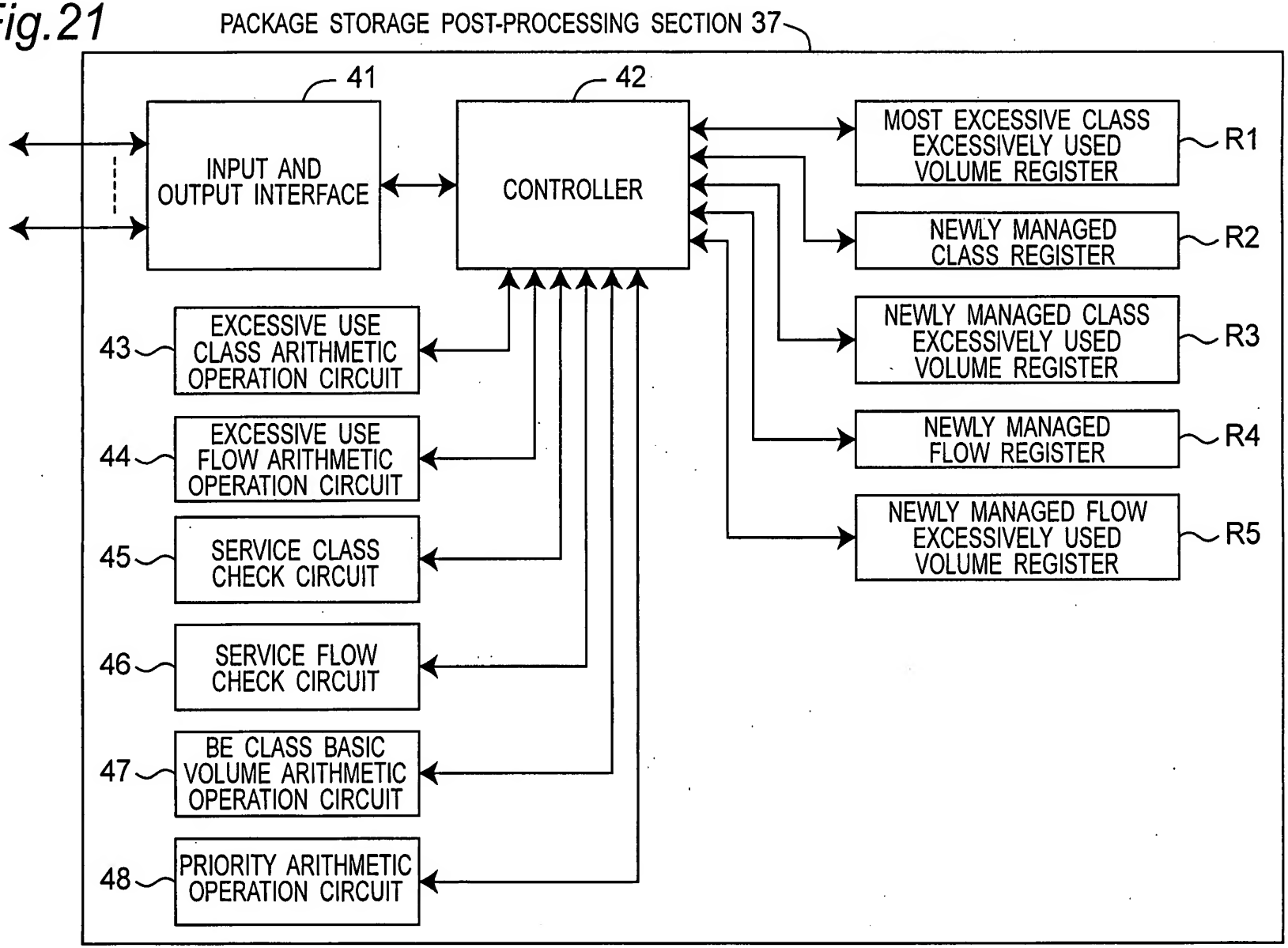
PACKAGE STORAGE POST-PROCESSING SECTION 37
41
42
INPUT AND OUTPUT INTERFACE
CONTROLLER
MOST EXCESSIVE CLASS EXCESSIVELY USED VOLUME REGISTER
R1
NEWLY MANAGED CLASS REGISTER
R2
NEWLY MANAGED CLASS EXCESSIVELY USED VOLUME REGISTER
R3
NEWLY MANAGED FLOW REGISTER
R4
NEWLY MANAGED FLOW EXCESSIVELY USED VOLUME REGISTER
R5
43
EXCESSIVE USE CLASS ARITHMETIC OPERATION CIRCUIT
44
EXCESSIVE USE FLOW ARITHMETIC OPERATION CIRCUIT
45
SERVICE CLASS CHECK CIRCUIT
46
SERVICE FLOW CHECK CIRCUIT
47
BE CLASS BASIC VOLUME ARITHMETIC OPERATION CIRCUIT
48
PRIORITY ARITHMETIC OPERATION CIRCUIT

Fig.22

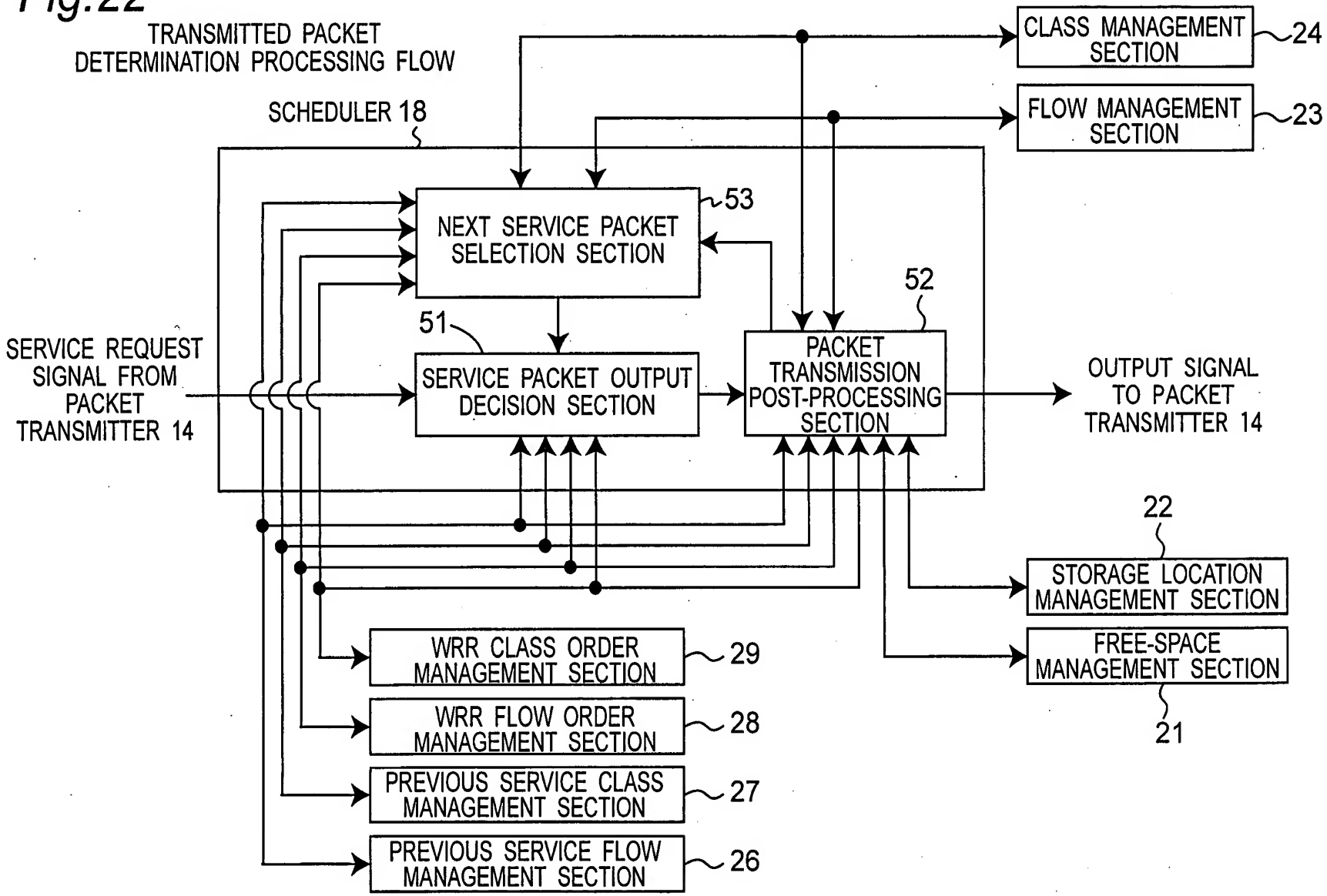
TRANSMITTED PACKET DETERMINATION PROCESSING FLOW
SCHEDULER 18
CLASS MANAGEMENT SECTION
24
FLOW MANAGEMENT SECTION
23
NEXT SERVICE PACKET SELECTION SECTION
53
52
51
SERVICE REQUEST SIGNAL FROM PACKET TRANSMITTER 14
SERVICE PACKET OUTPUT DECISION SECTION
PACKET TRANSMISSION POST-PROCESSING SECTION
OUTPUT SIGNAL TO PACKET TRANSMITTER 14
22
STORAGE LOCATION MANAGEMENT SECTION
FREE-SPACE MANAGEMENT SECTION
21
WRR CLASS ORDER MANAGEMENT SECTION
29
WRR FLOW ORDER MANAGEMENT SECTION
28
PREVIOUS SERVICE CLASS MANAGEMENT SECTION
27
PREVIOUS SERVICE FLOW MANAGEMENT SECTION
26

Fig.23

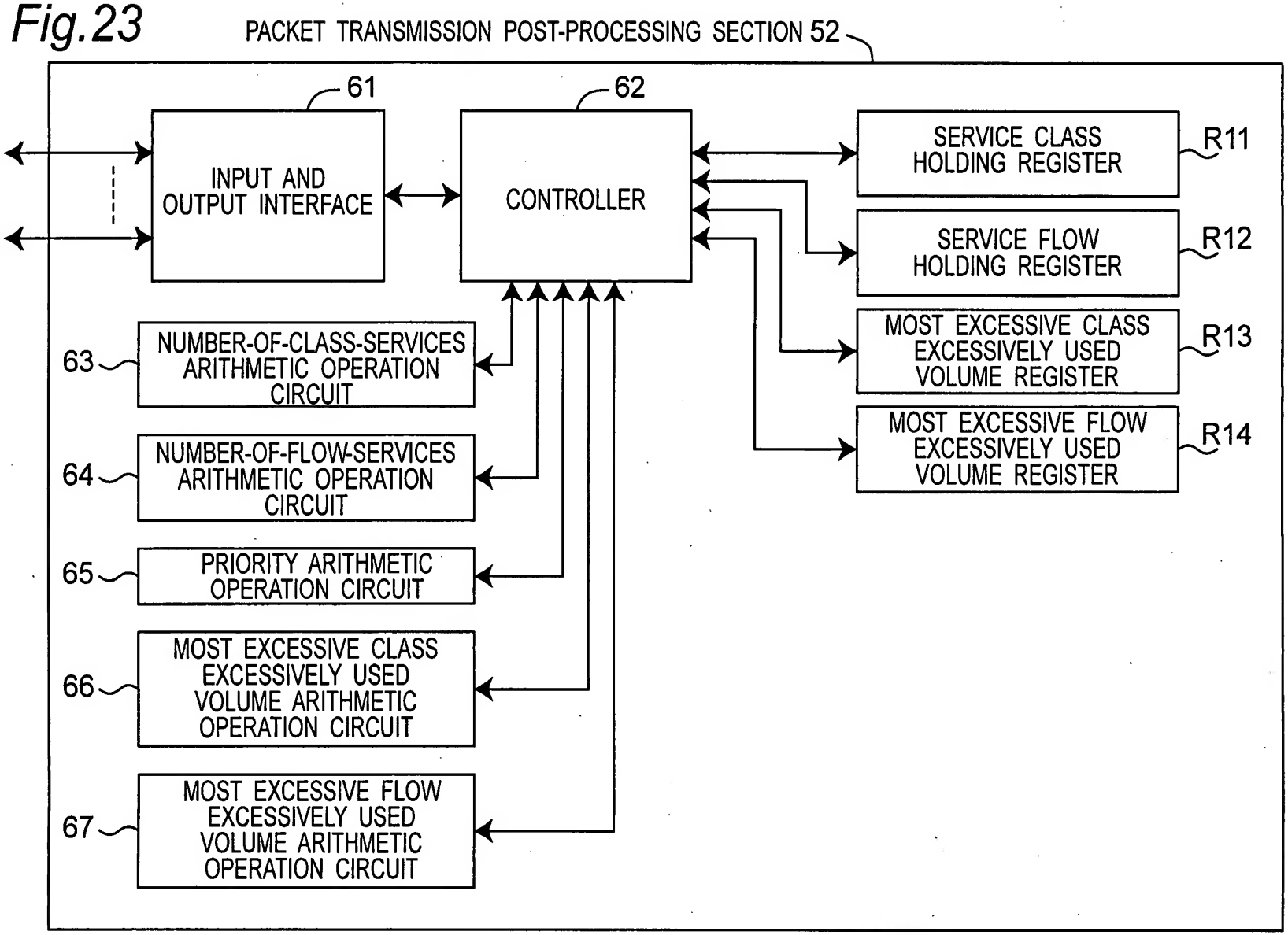
PACKET TRANSMISSION POST-PROCESSING SECTION 52
61
62
INPUT AND OUTPUT INTERFACE
CONTROLLER
SERVICE CLASS HOLDING REGISTER
R11
SERVICE FLOW HOLDING REGISTER
R12
MOST EXCESSIVE CLASS EXCESSIVELY USED VOLUME REGISTER
R13
MOST EXCESSIVE FLOW EXCESSIVELY USED VOLUME REGISTER
R14
63
NUMBER-OF-CLASS-SERVICES ARITHMETIC OPERATION CIRCUIT
64
NUMBER-OF-FLOW-SERVICES ARITHMETIC OPERATION CIRCUIT
65
PRIORITY ARITHMETIC OPERATION CIRCUIT
66
MOST EXCESSIVE CLASS EXCESSIVELY USED VOLUME ARITHMETIC OPERATION CIRCUIT
67
MOST EXCESSIVE FLOW EXCESSIVELY USED VOLUME ARITHMETIC OPERATION CIRCUIT

Fig.24

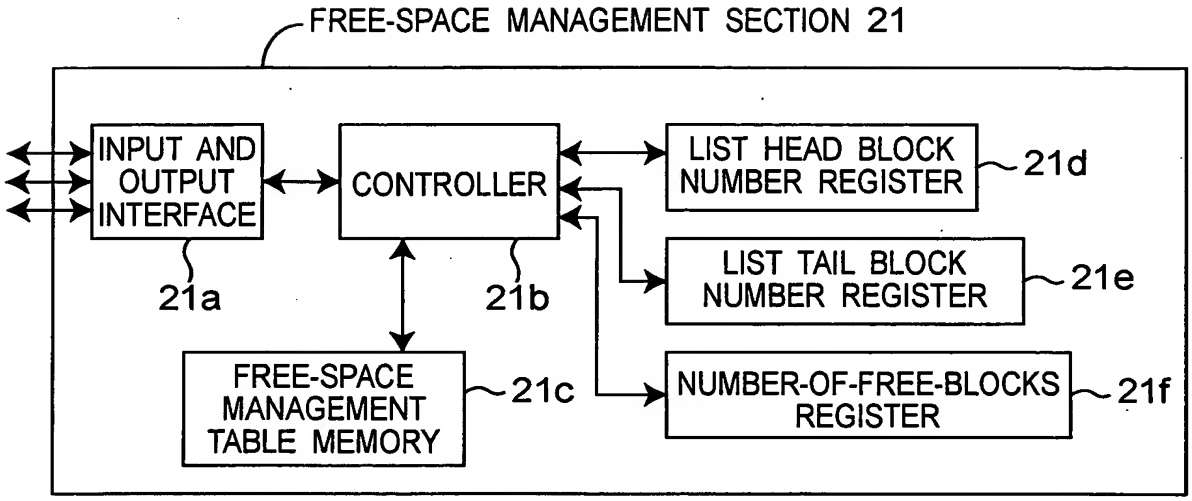

Fig.25A

BLOCK NUMBER	NEXT BLOCK NUMBER
0	−1
1	2
2	3
⋮	⋮
2^F-2	427

21c

Fig.25B

LIST HEAD BLOCK NUMBER	21d
1	

Fig.25C

LIST TAIL BLOCK NUMBER	21e
53	

Fig.25D

NUMBER OF FREE BLOCKS	21f
148	

Fig.26

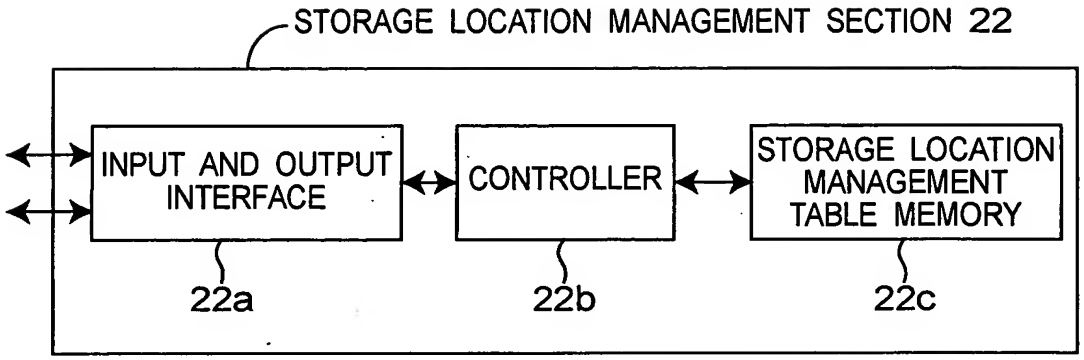

Fig.27

BLOCK NUMBER	NEXT BLOCK NUMBER
0	1
1	6
2	13
⋮	⋮
2^F-2	−1

22c

Fig.28

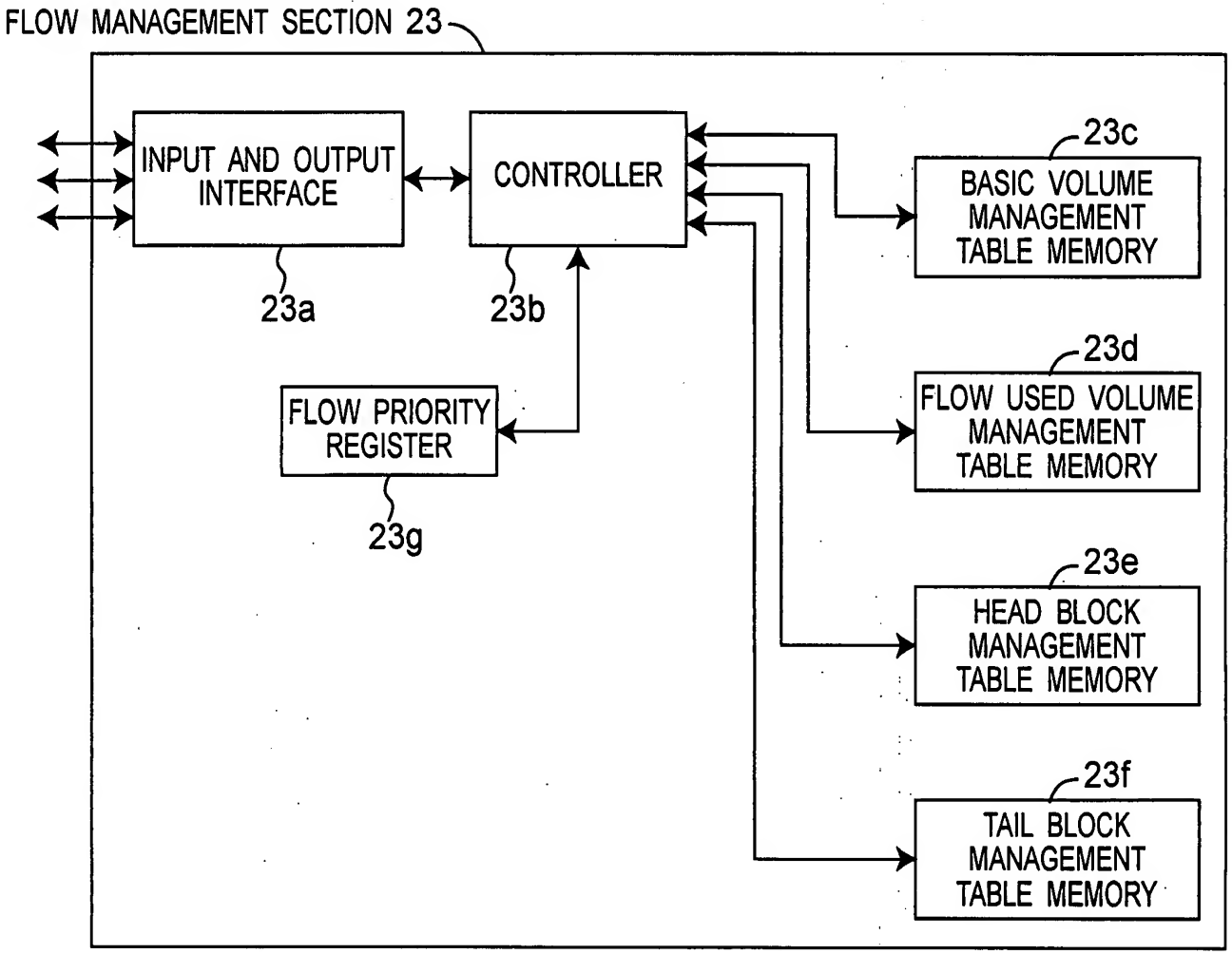
FLOW MANAGEMENT SECTION 23
INPUT AND OUTPUT INTERFACE
CONTROLLER
23a
23b
FLOW PRIORITY REGISTER
23g
23c
BASIC VOLUME MANAGEMENT TABLE MEMORY
23d
FLOW USED VOLUME MANAGEMENT TABLE MEMORY
23e
HEAD BLOCK MANAGEMENT TABLE MEMORY
23f
TAIL BLOCK MANAGEMENT TABLE MEMORY

Fig.29A

FLOW ID	BASIC VOLUME
0	13
1	0
2	20
⋮	⋮
2^F-2	0

23c

Fig.29B

FLOW ID	USED VOLUME
0	18
1	9
2	5
⋮	⋮
2^F-2	0

23d

Fig.29C

FLOW ID	HEAD BLOCK NUMBER
0	0
1	19
2	23
⋮	⋮
2^F-2	-1

23e

Fig.29D

FLOW ID	TAIL BLOCK NUMBER
0	21
1	7
2	27
⋮	⋮
2^F-2	-1

23f

Fig.30

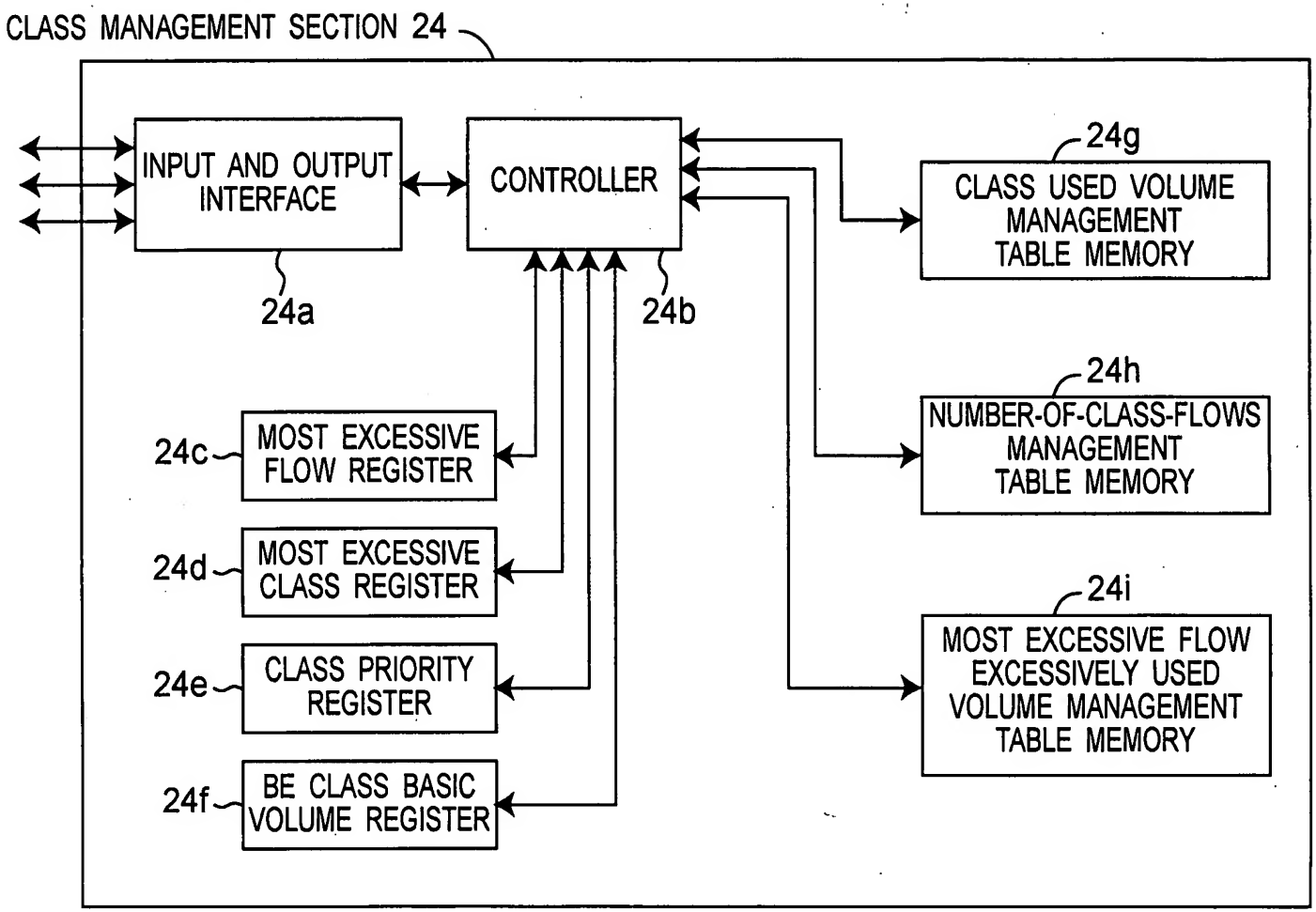
CLASS MANAGEMENT SECTION 24
INPUT AND OUTPUT INTERFACE
CONTROLLER
24a
24b
24g
CLASS USED VOLUME MANAGEMENT TABLE MEMORY
24h
NUMBER-OF-CLASS-FLOWS MANAGEMENT TABLE MEMORY
24i
MOST EXCESSIVE FLOW EXCESSIVELY USED VOLUME MANAGEMENT TABLE MEMORY
24c
MOST EXCESSIVE FLOW REGISTER
24d
MOST EXCESSIVE CLASS REGISTER
24e
CLASS PRIORITY REGISTER
24f
BE CLASS BASIC VOLUME REGISTER

Fig.31A

CLASS ID	USED VOLUME
0	32
1	24
2	48
⋮	⋮
2^C-2	12

24g

Fig.31B

CLASS ID	NUMBER OF FLOWS
0	4
1	8
2	10
⋮	⋮
2^C-2	2

24h

Fig.31C

CLASS ID	EXCESSIVELY USED VOLUME
0	0
1	18
2	3
⋮	⋮
2^C-2	0

24i

Fig.32

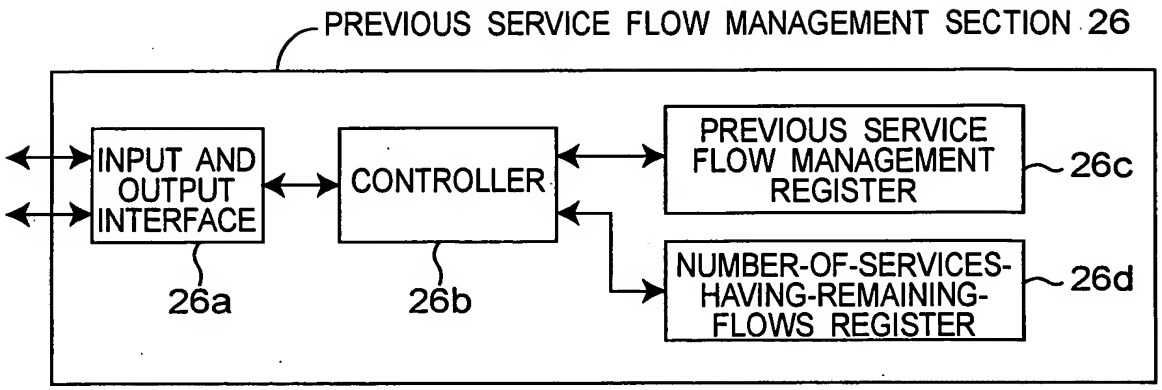
PREVIOUS SERVICE FLOW MANAGEMENT SECTION 26
INPUT AND OUTPUT INTERFACE
CONTROLLER
PREVIOUS SERVICE FLOW MANAGEMENT REGISTER
26c
NUMBER-OF-SERVICES-HAVING-REMAINING-FLOWS REGISTER
26d
26a
26b

Fig.33

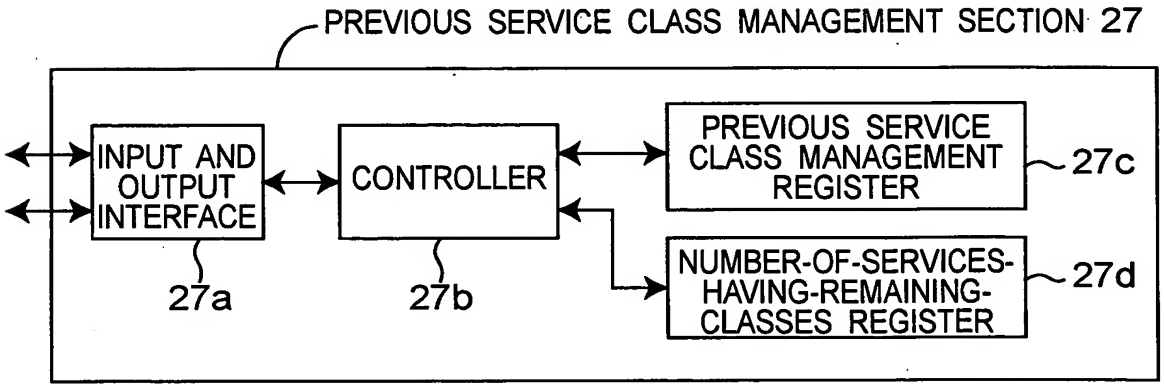
PREVIOUS SERVICE CLASS MANAGEMENT SECTION 27
INPUT AND OUTPUT INTERFACE
CONTROLLER
PREVIOUS SERVICE CLASS MANAGEMENT REGISTER
27c
NUMBER-OF-SERVICES-HAVING-REMAINING-CLASSES REGISTER
27d
27a
27b

Fig.34

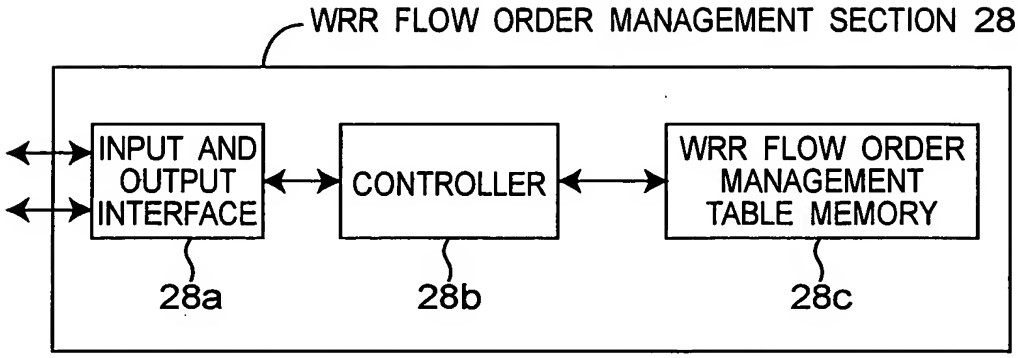

Fig.35

FLOW ID	NEXT SERVICE FLOW ID
0	1
1	5
2	3
⋮	⋮
5	0
⋮	⋮
2^F-2	-1

28c

Fig.36

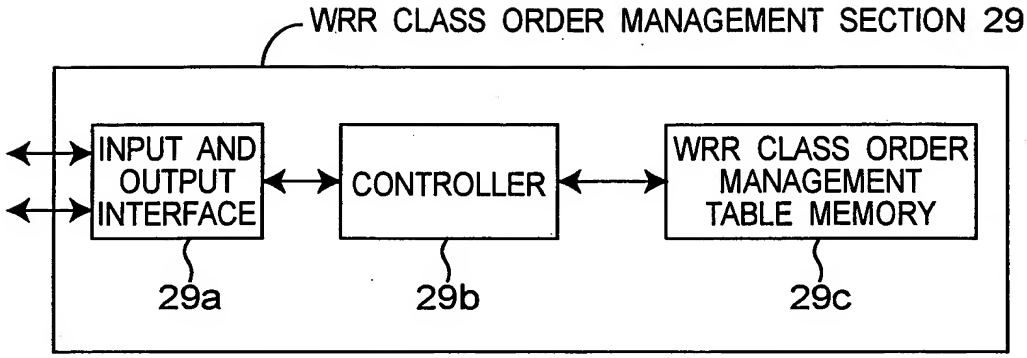

Fig.37

CLASS ID	NEXT SERVICE CLASS ID
0	1
1	0
2	-1
⋮	⋮
$2^{C}-2$	4

29c

Fig.38A

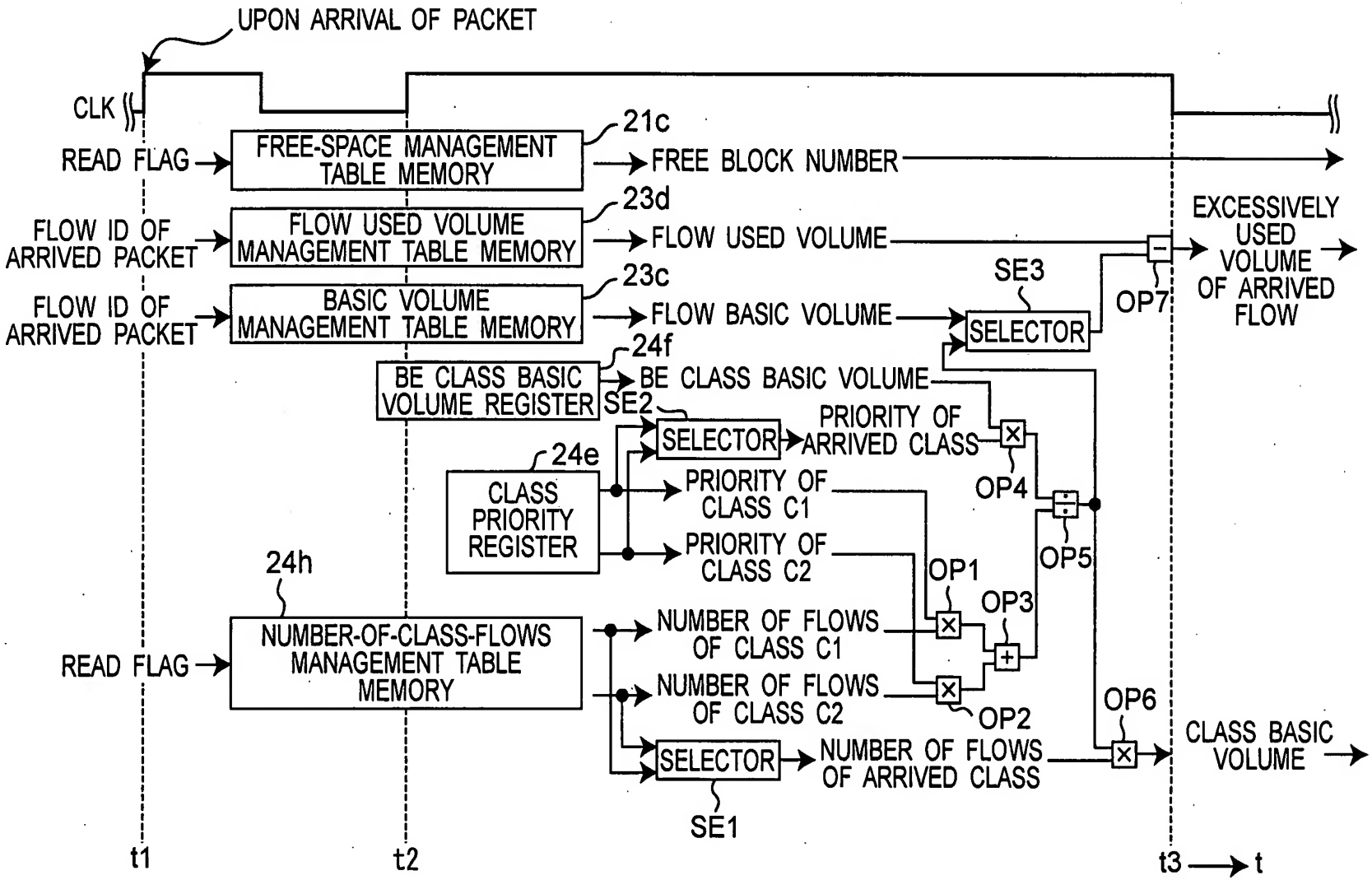
UPON ARRIVAL OF PACKET
CLK
READ FLAG
FREE-SPACE MANAGEMENT TABLE MEMORY
21c
FREE BLOCK NUMBER
FLOW ID OF ARRIVED PACKET
FLOW USED VOLUME MANAGEMENT TABLE MEMORY
23d
FLOW USED VOLUME
EXCESSIVELY USED VOLUME OF ARRIVED FLOW
FLOW ID OF ARRIVED PACKET
BASIC VOLUME MANAGEMENT TABLE MEMORY
23c
FLOW BASIC VOLUME
SE3
SELECTOR
OP7
BE CLASS BASIC VOLUME REGISTER
24f
BE CLASS BASIC VOLUME
SE2
SELECTOR
PRIORITY OF ARRIVED CLASS
OP4
24e
CLASS PRIORITY REGISTER
PRIORITY OF CLASS C1
PRIORITY OF CLASS C2
OP5
OP1
OP3
24h
READ FLAG
NUMBER-OF-CLASS-FLOWS MANAGEMENT TABLE MEMORY
NUMBER OF FLOWS OF CLASS C1
NUMBER OF FLOWS OF CLASS C2
OP2
OP6
CLASS BASIC VOLUME
SELECTOR
NUMBER OF FLOWS OF ARRIVED CLASS
SE1
t1
t2
t3
t

Fig.38B

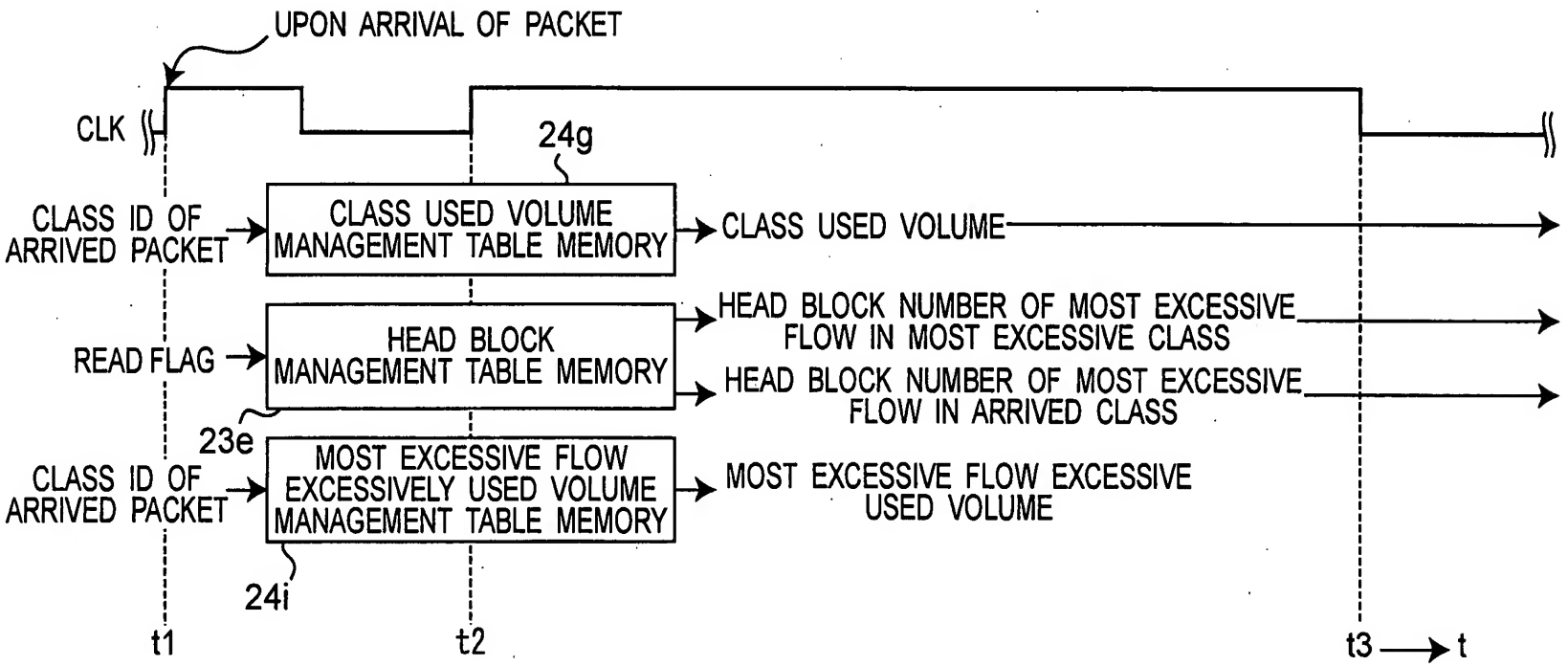
UPON ARRIVAL OF PACKET
CLK
24g
CLASS ID OF ARRIVED PACKET
CLASS USED VOLUME MANAGEMENT TABLE MEMORY
CLASS USED VOLUME
READ FLAG
HEAD BLOCK MANAGEMENT TABLE MEMORY
HEAD BLOCK NUMBER OF MOST EXCESSIVE FLOW IN MOST EXCESSIVE CLASS
HEAD BLOCK NUMBER OF MOST EXCESSIVE FLOW IN ARRIVED CLASS
23e
CLASS ID OF ARRIVED PACKET
MOST EXCESSIVE FLOW EXCESSIVELY USED VOLUME MANAGEMENT TABLE MEMORY
MOST EXCESSIVE FLOW EXCESSIVE USED VOLUME
24i
t1
t2
t3
t

Fig.39A

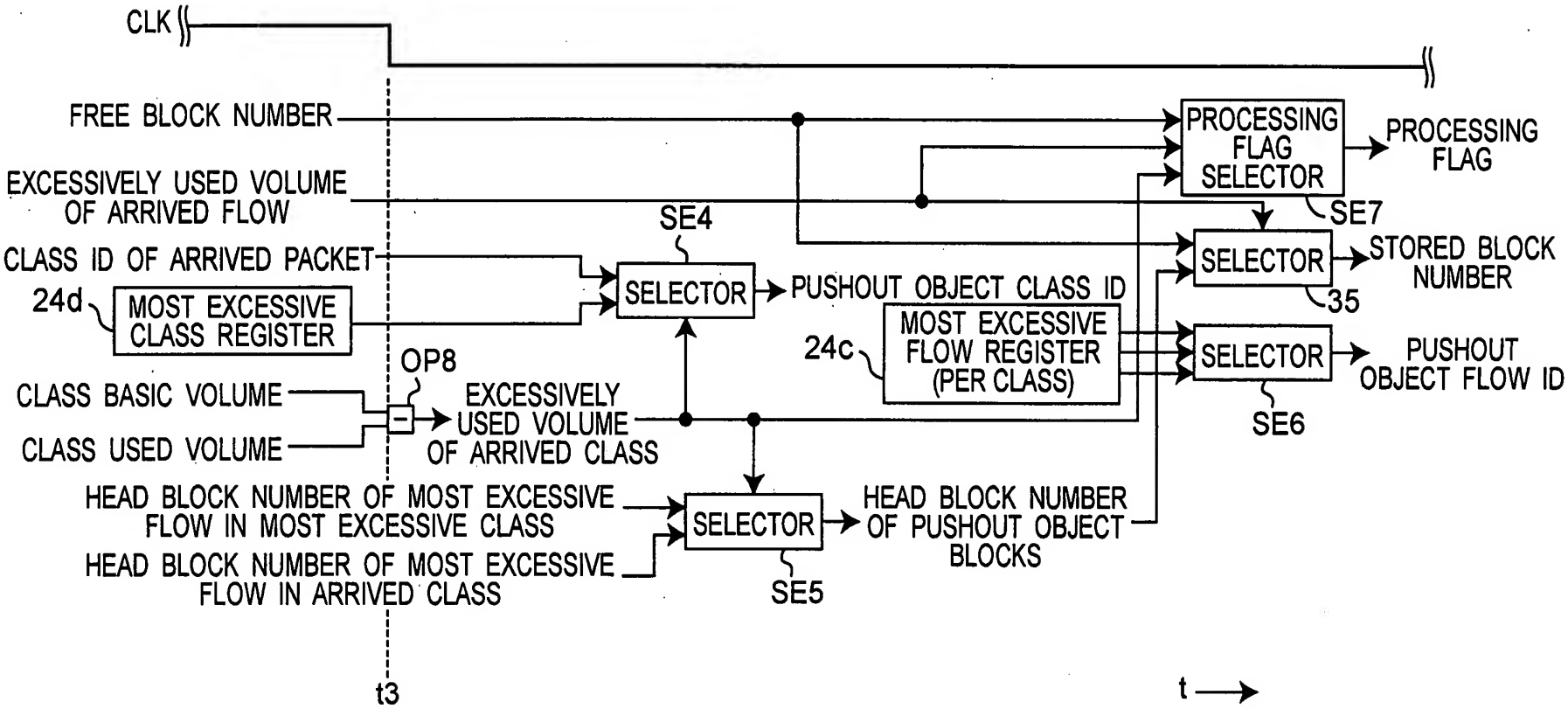
CLK
FREE BLOCK NUMBER
EXCESSIVELY USED VOLUME OF ARRIVED FLOW
CLASS ID OF ARRIVED PACKET
24d
MOST EXCESSIVE CLASS REGISTER
SE4
SELECTOR
PUSHOUT OBJECT CLASS ID
OP8
CLASS BASIC VOLUME
CLASS USED VOLUME
EXCESSIVELY USED VOLUME OF ARRIVED CLASS
HEAD BLOCK NUMBER OF MOST EXCESSIVE FLOW IN MOST EXCESSIVE CLASS
HEAD BLOCK NUMBER OF MOST EXCESSIVE FLOW IN ARRIVED CLASS
SELECTOR
SE5
HEAD BLOCK NUMBER OF PUSHOUT OBJECT BLOCKS
24c
MOST EXCESSIVE FLOW REGISTER (PER CLASS)
PROCESSING FLAG SELECTOR
SE7
PROCESSING FLAG
SELECTOR
35
STORED BLOCK NUMBER
SELECTOR
SE6
PUSHOUT OBJECT FLOW ID
t3
t

Fig.39B

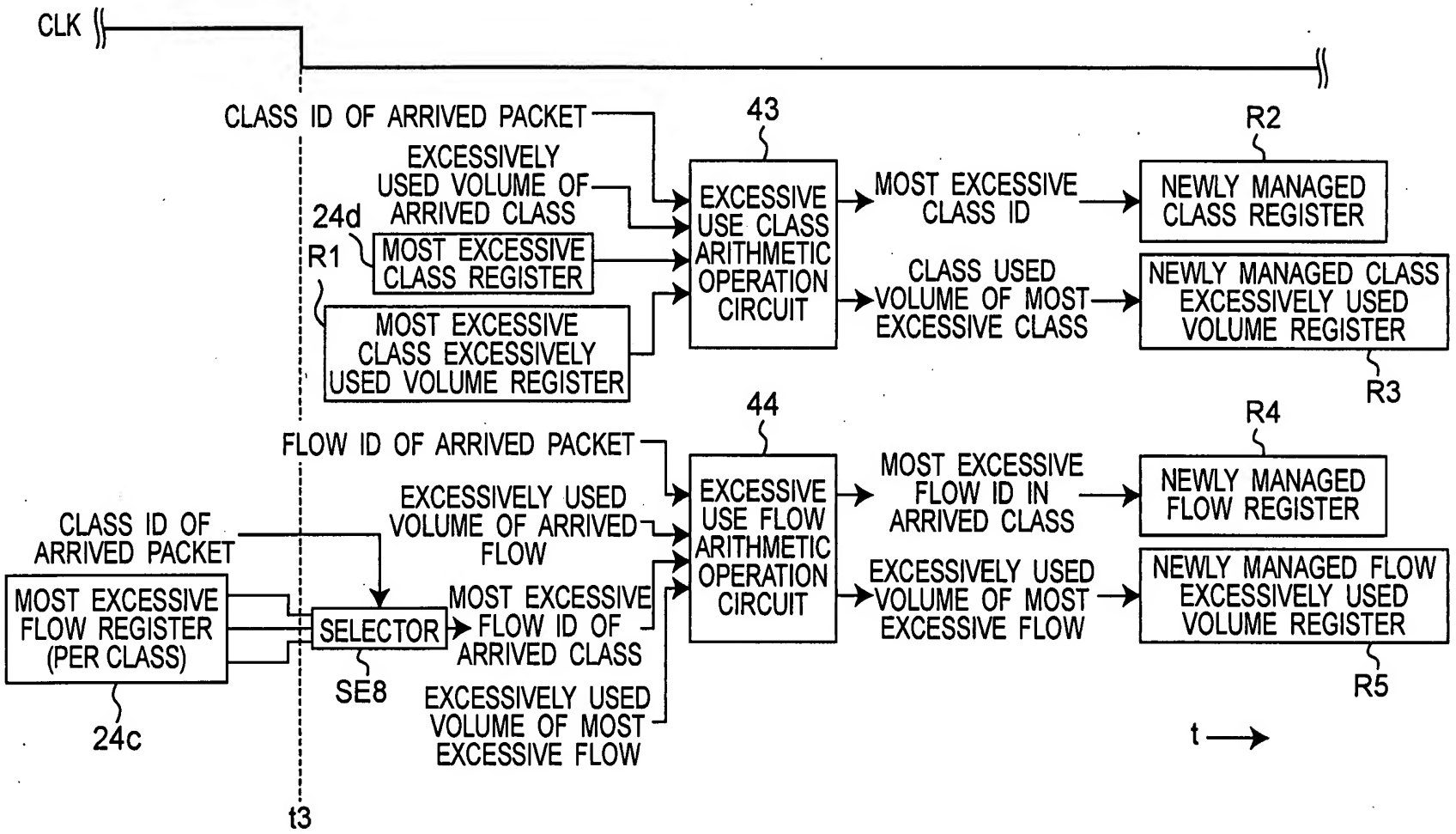
CLK
CLASS ID OF ARRIVED PACKET
EXCESSIVELY USED VOLUME OF ARRIVED CLASS
24d
R1
MOST EXCESSIVE CLASS REGISTER
MOST EXCESSIVE CLASS EXCESSIVELY USED VOLUME REGISTER
43
EXCESSIVE USE CLASS ARITHMETIC OPERATION CIRCUIT
MOST EXCESSIVE CLASS ID
CLASS USED VOLUME OF MOST EXCESSIVE CLASS
R2
NEWLY MANAGED CLASS REGISTER
NEWLY MANAGED CLASS EXCESSIVELY USED VOLUME REGISTER
R3
FLOW ID OF ARRIVED PACKET
EXCESSIVELY USED VOLUME OF ARRIVED FLOW
CLASS ID OF ARRIVED PACKET
MOST EXCESSIVE FLOW REGISTER (PER CLASS)
SELECTOR
SE8
MOST EXCESSIVE FLOW ID OF ARRIVED CLASS
EXCESSIVELY USED VOLUME OF MOST EXCESSIVE FLOW
24c
44
EXCESSIVE USE FLOW ARITHMETIC OPERATION CIRCUIT
MOST EXCESSIVE FLOW ID IN ARRIVED CLASS
EXCESSIVELY USED VOLUME OF MOST EXCESSIVE FLOW
R4
NEWLY MANAGED FLOW REGISTER
NEWLY MANAGED FLOW EXCESSIVELY USED VOLUME REGISTER
R5
t
t3

Fig.40A

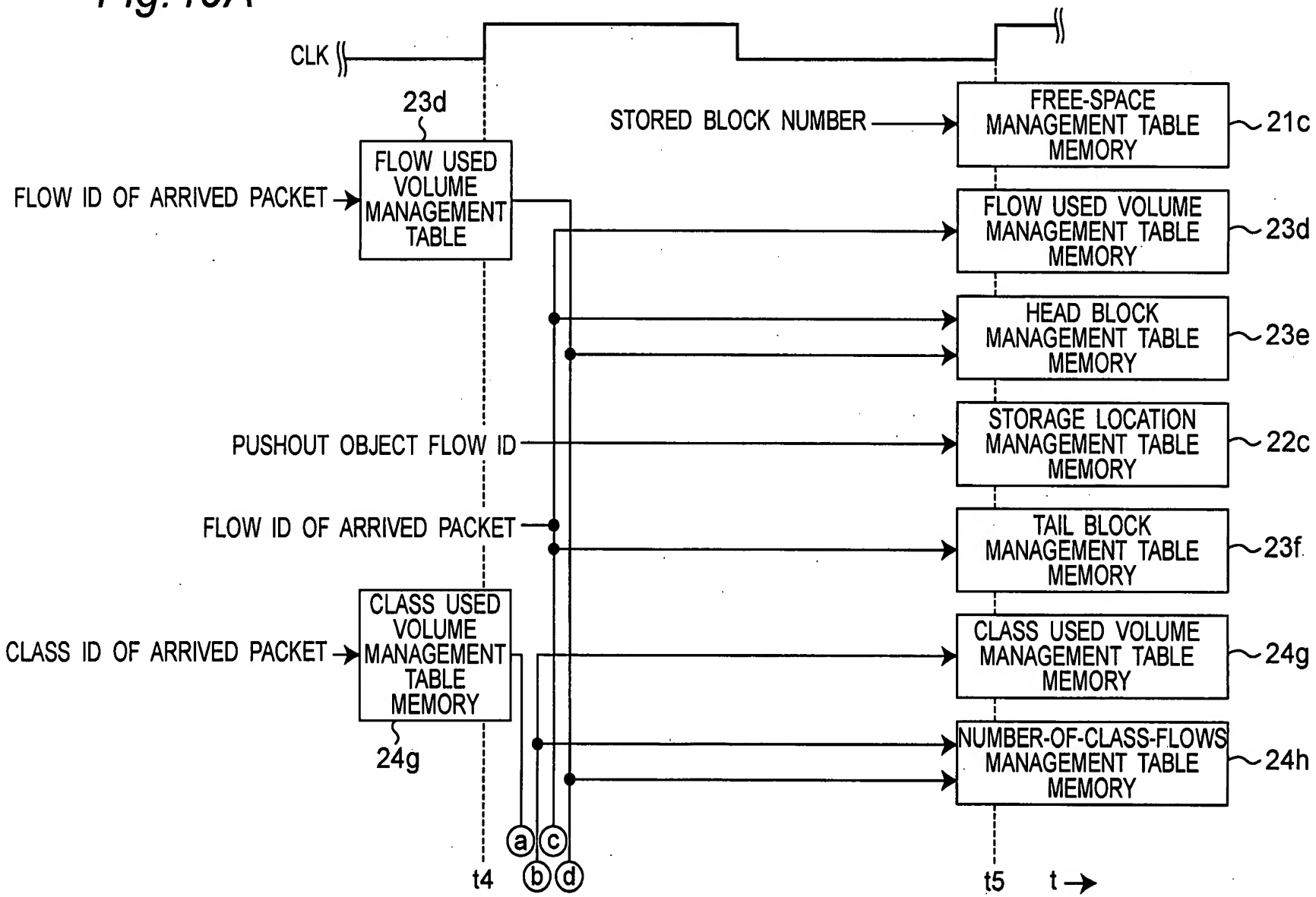
CLK
23d
FLOW USED VOLUME MANAGEMENT TABLE
FLOW ID OF ARRIVED PACKET
PUSHOUT OBJECT FLOW ID
FLOW ID OF ARRIVED PACKET
CLASS USED VOLUME MANAGEMENT TABLE MEMORY
CLASS ID OF ARRIVED PACKET
24g
STORED BLOCK NUMBER
FREE-SPACE MANAGEMENT TABLE MEMORY
21c
FLOW USED VOLUME MANAGEMENT TABLE MEMORY
23d
HEAD BLOCK MANAGEMENT TABLE MEMORY
23e
STORAGE LOCATION MANAGEMENT TABLE MEMORY
22c
TAIL BLOCK MANAGEMENT TABLE MEMORY
23f
CLASS USED VOLUME MANAGEMENT TABLE MEMORY
24g
NUMBER-OF-CLASS-FLOWS MANAGEMENT TABLE MEMORY
24h
a
c
b
d
t4
t5
t

Fig.40B

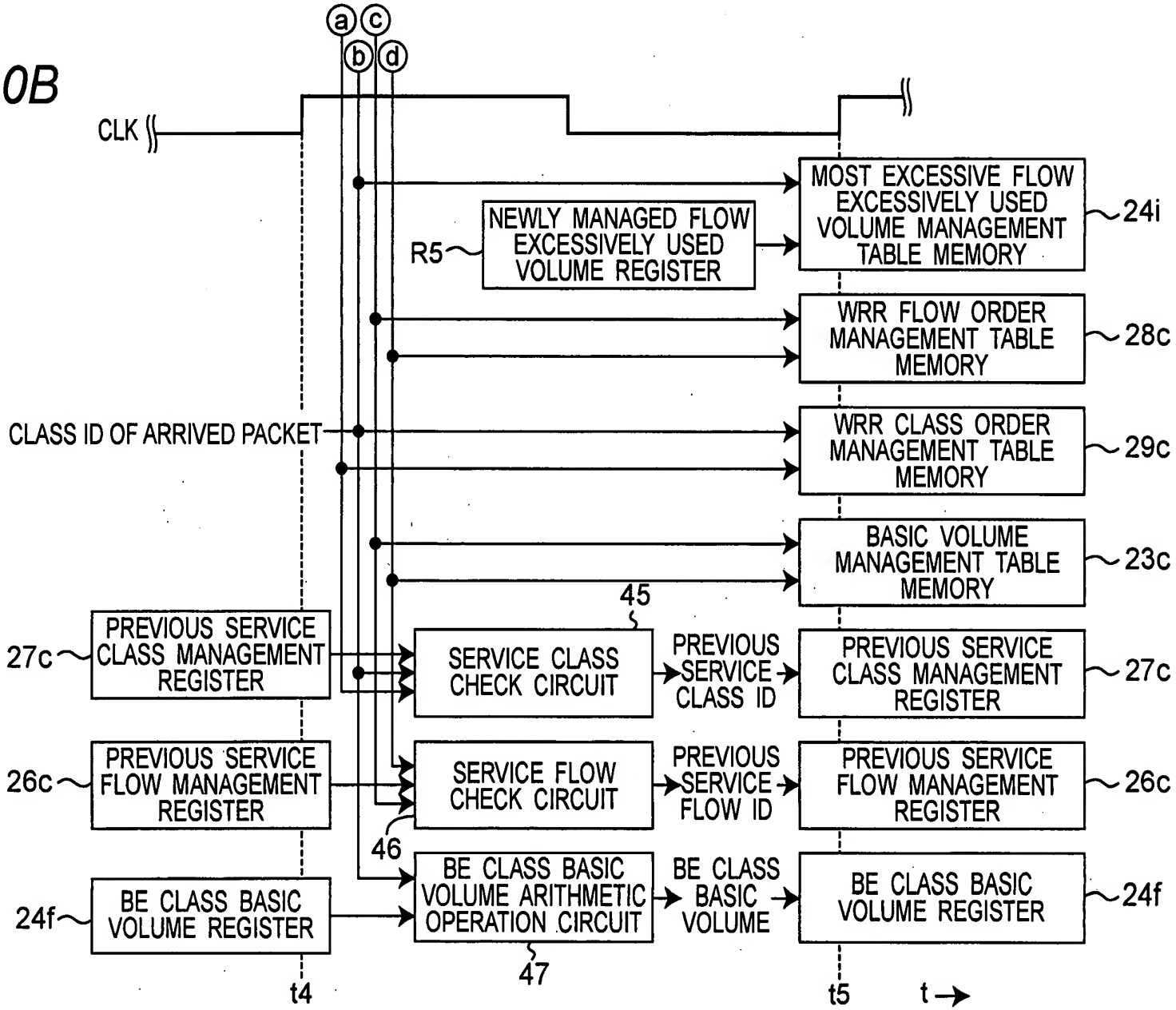
a
c
b
d
CLK
MOST EXCESSIVE FLOW EXCESSIVELY USED VOLUME MANAGEMENT TABLE MEMORY
24i
R5
NEWLY MANAGED FLOW EXCESSIVELY USED VOLUME REGISTER
WRR FLOW ORDER MANAGEMENT TABLE MEMORY
28c
CLASS ID OF ARRIVED PACKET
WRR CLASS ORDER MANAGEMENT TABLE MEMORY
29c
BASIC VOLUME MANAGEMENT TABLE MEMORY
23c
45
27c
PREVIOUS SERVICE CLASS MANAGEMENT REGISTER
SERVICE CLASS CHECK CIRCUIT
PREVIOUS SERVICE CLASS ID
PREVIOUS SERVICE CLASS MANAGEMENT REGISTER
27c
26c
PREVIOUS SERVICE FLOW MANAGEMENT REGISTER
SERVICE FLOW CHECK CIRCUIT
PREVIOUS SERVICE FLOW ID
PREVIOUS SERVICE FLOW MANAGEMENT REGISTER
26c
46
24f
BE CLASS BASIC VOLUME REGISTER
BE CLASS BASIC VOLUME ARITHMETIC OPERATION CIRCUIT
BE CLASS BASIC VOLUME
BE CLASS BASIC VOLUME REGISTER
24f
47
t4
t5
t

Fig.41A

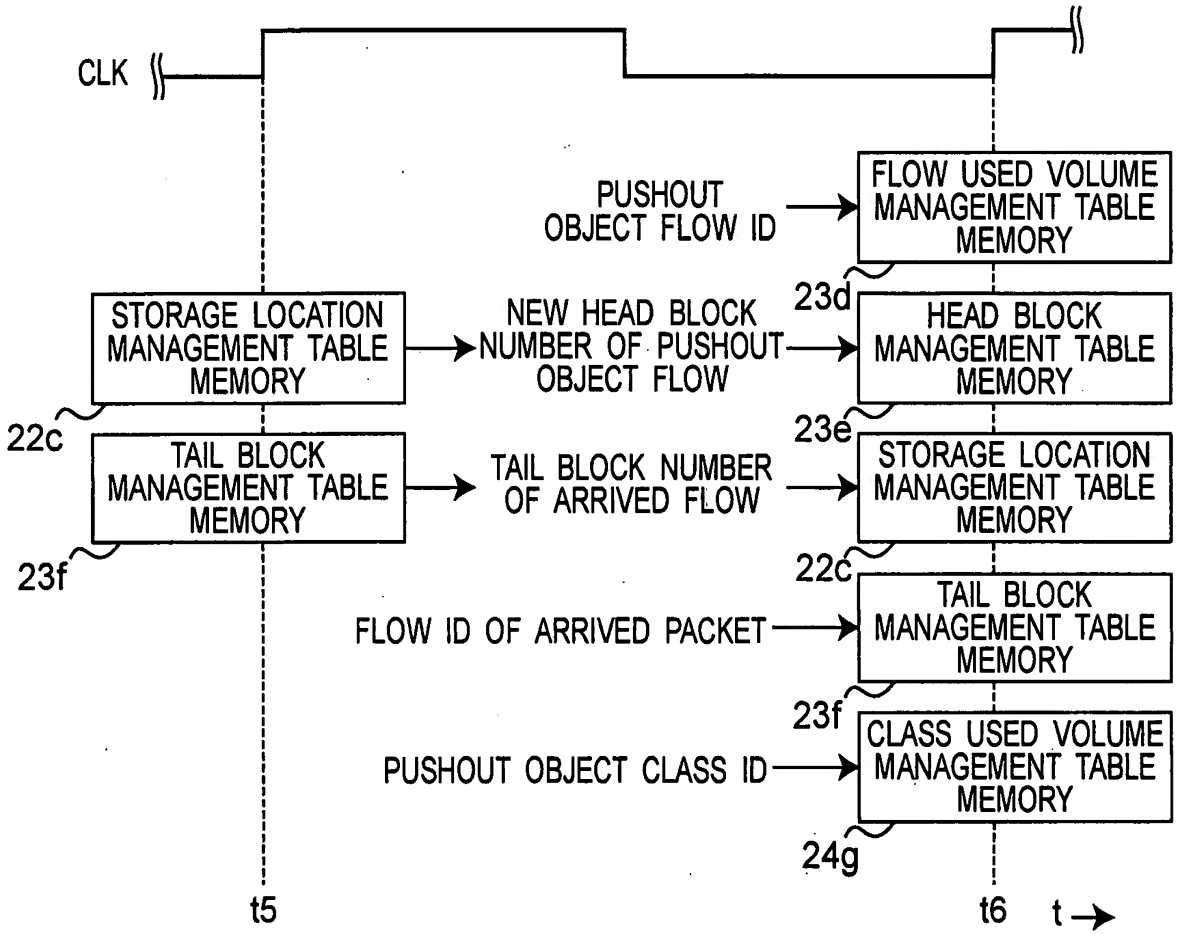
CLK
PUSHOUT OBJECT FLOW ID
FLOW USED VOLUME MANAGEMENT TABLE MEMORY
23d
STORAGE LOCATION MANAGEMENT TABLE MEMORY
NEW HEAD BLOCK NUMBER OF PUSHOUT OBJECT FLOW
HEAD BLOCK MANAGEMENT TABLE MEMORY
22c
23e
TAIL BLOCK MANAGEMENT TABLE MEMORY
TAIL BLOCK NUMBER OF ARRIVED FLOW
STORAGE LOCATION MANAGEMENT TABLE MEMORY
23f
22c
FLOW ID OF ARRIVED PACKET
TAIL BLOCK MANAGEMENT TABLE MEMORY
23f
PUSHOUT OBJECT CLASS ID
CLASS USED VOLUME MANAGEMENT TABLE MEMORY
24g
t5
t6
t

Fig.41B

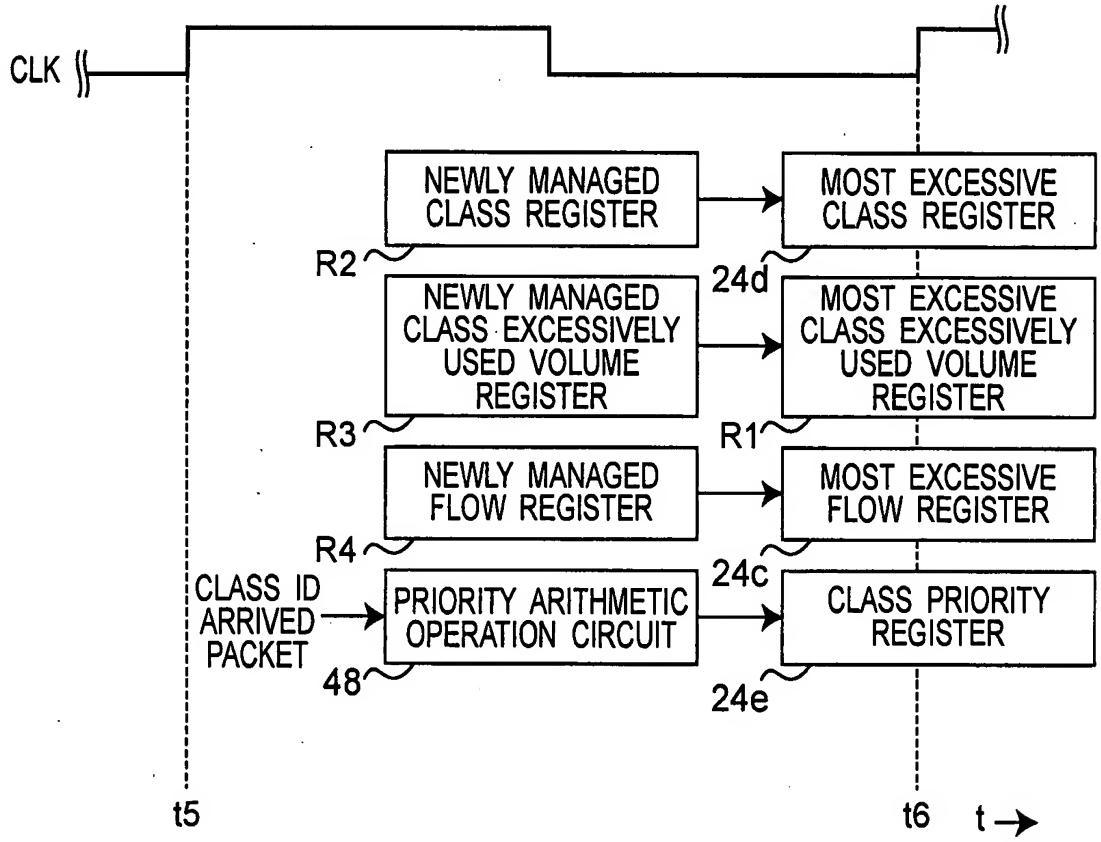
CLK
NEWLY MANAGED CLASS REGISTER
R2
MOST EXCESSIVE CLASS REGISTER
24d
NEWLY MANAGED CLASS EXCESSIVELY USED VOLUME REGISTER
R3
MOST EXCESSIVE CLASS EXCESSIVELY USED VOLUME REGISTER
R1
NEWLY MANAGED FLOW REGISTER
R4
MOST EXCESSIVE FLOW REGISTER
24c
CLASS ID ARRIVED PACKET
PRIORITY ARITHMETIC OPERATION CIRCUIT
48
CLASS PRIORITY REGISTER
24e
t5
t6
t

Fig.42

EXCESSIVELY USED VOLUME ARITHMETIC PROCESSING FOR FLOW BELONGING TO BEST-EFFORT CLASS

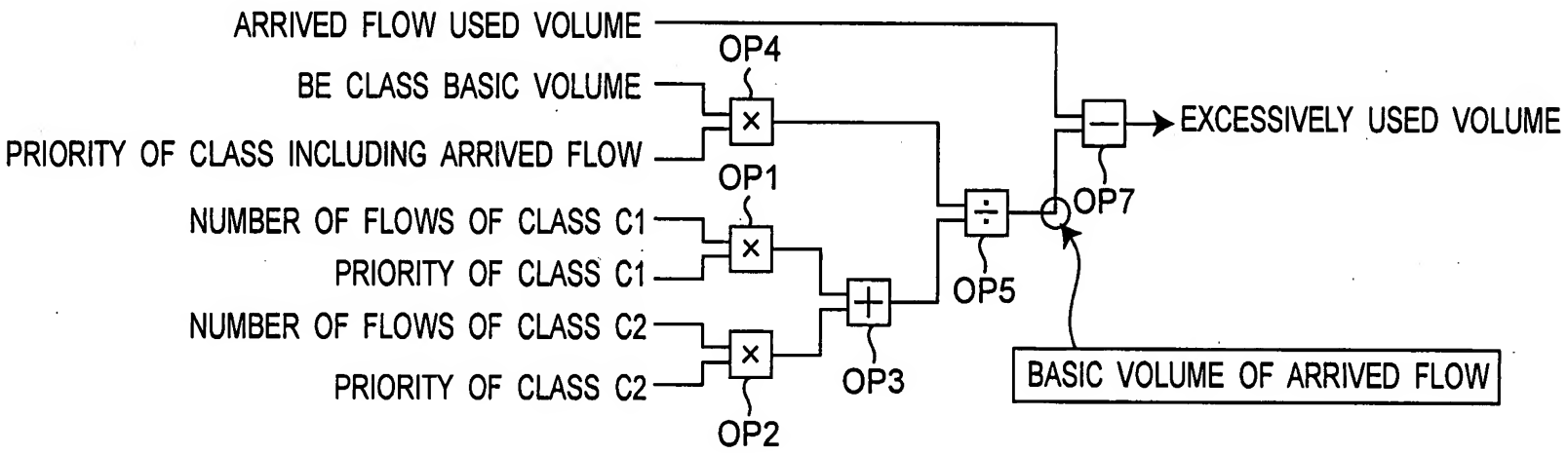

Fig.43

EXCESSIVELY USED VOLUME ARITHMETIC PROCESSING FOR FLOW BELONGING TO BANDWIDTH-GUARANTEED CLASS

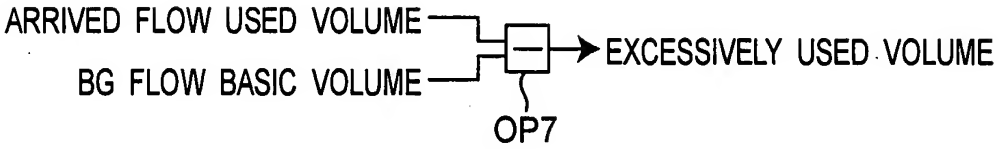

Fig.44

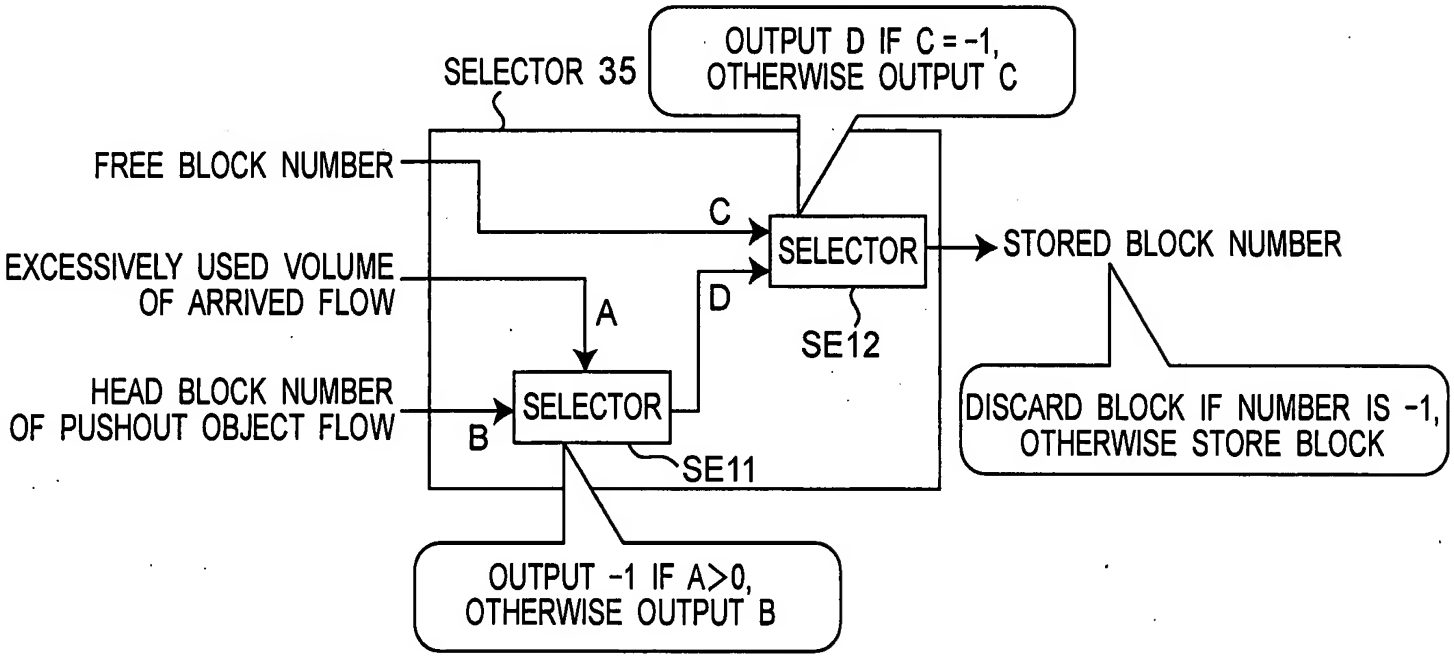
SELECTOR 35
OUTPUT D IF C = -1,
OTHERWISE OUTPUT C
FREE BLOCK NUMBER
C
SELECTOR
STORED BLOCK NUMBER
EXCESSIVELY USED VOLUME
OF ARRIVED FLOW
A
D
SE12
HEAD BLOCK NUMBER
OF PUSHOUT OBJECT FLOW
SELECTOR
B
SE11
DISCARD BLOCK IF NUMBER IS -1,
OTHERWISE STORE BLOCK
OUTPUT -1 IF A>0,
OTHERWISE OUTPUT B

Fig.45

UPON TRANSMISSION OF PACKET

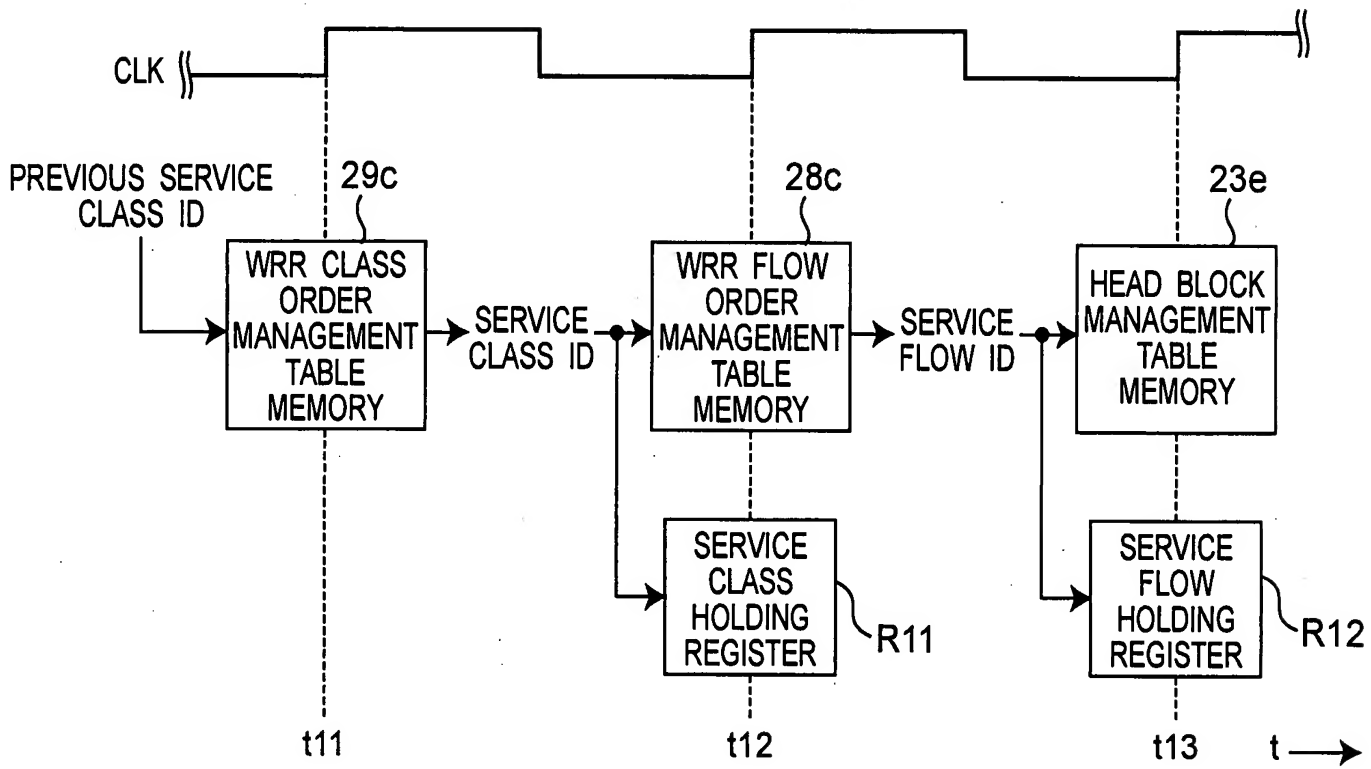

Fig.46A

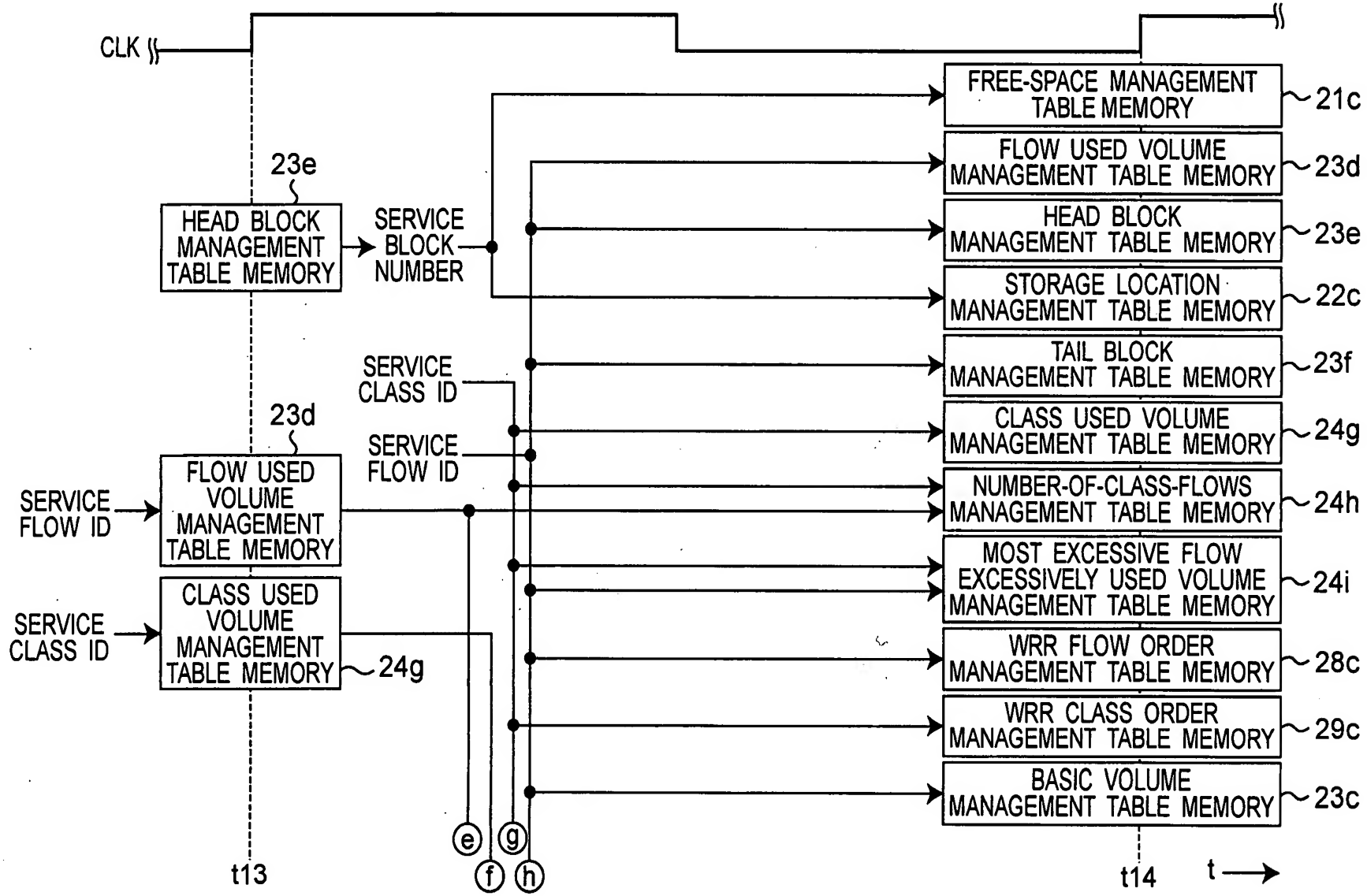
CLK
23e
HEAD BLOCK MANAGEMENT TABLE MEMORY
SERVICE BLOCK NUMBER
SERVICE CLASS ID
SERVICE FLOW ID
23d
FLOW USED VOLUME MANAGEMENT TABLE MEMORY
SERVICE FLOW ID
SERVICE CLASS ID
CLASS USED VOLUME MANAGEMENT TABLE MEMORY
24g
t13
e
f
g
h
FREE-SPACE MANAGEMENT TABLE MEMORY
21c
FLOW USED VOLUME MANAGEMENT TABLE MEMORY
23d
HEAD BLOCK MANAGEMENT TABLE MEMORY
23e
STORAGE LOCATION MANAGEMENT TABLE MEMORY
22c
TAIL BLOCK MANAGEMENT TABLE MEMORY
23f
CLASS USED VOLUME MANAGEMENT TABLE MEMORY
24g
NUMBER-OF-CLASS-FLOWS MANAGEMENT TABLE MEMORY
24h
MOST EXCESSIVE FLOW EXCESSIVELY USED VOLUME MANAGEMENT TABLE MEMORY
24i
WRR FLOW ORDER MANAGEMENT TABLE MEMORY
28c
WRR CLASS ORDER MANAGEMENT TABLE MEMORY
29c
BASIC VOLUME MANAGEMENT TABLE MEMORY
23c
t14
t

Fig.46B

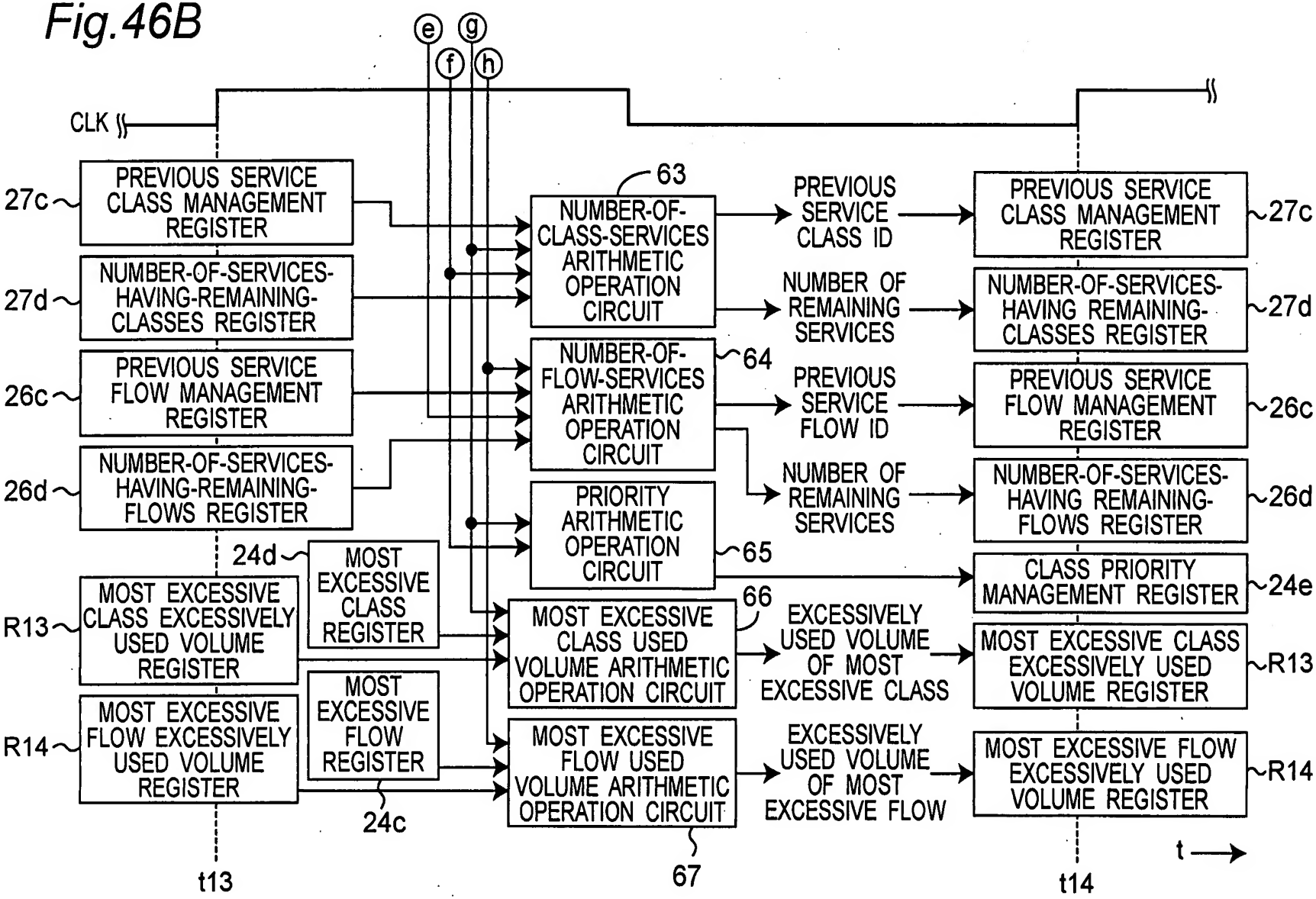
CLK
e
f
g
h
27c
PREVIOUS SERVICE CLASS MANAGEMENT REGISTER
27d
NUMBER-OF-SERVICES-HAVING-REMAINING-CLASSES REGISTER
26c
PREVIOUS SERVICE FLOW MANAGEMENT REGISTER
26d
NUMBER-OF-SERVICES-HAVING-REMAINING-FLOWS REGISTER
24d
MOST EXCESSIVE CLASS REGISTER
R13
MOST EXCESSIVE CLASS EXCESSIVELY USED VOLUME REGISTER
R14
MOST EXCESSIVE FLOW EXCESSIVELY USED VOLUME REGISTER
MOST EXCESSIVE FLOW REGISTER
24c
t13
63
NUMBER-OF-CLASS-SERVICES ARITHMETIC OPERATION CIRCUIT
64
NUMBER-OF-FLOW-SERVICES ARITHMETIC OPERATION CIRCUIT
PRIORITY ARITHMETIC OPERATION CIRCUIT
65
66
MOST EXCESSIVE CLASS USED VOLUME ARITHMETIC OPERATION CIRCUIT
MOST EXCESSIVE FLOW USED VOLUME ARITHMETIC OPERATION CIRCUIT
67
PREVIOUS SERVICE CLASS ID
NUMBER OF REMAINING SERVICES
PREVIOUS SERVICE FLOW ID
NUMBER OF REMAINING SERVICES
EXCESSIVELY USED VOLUME OF MOST EXCESSIVE CLASS
EXCESSIVELY USED VOLUME OF MOST EXCESSIVE FLOW
PREVIOUS SERVICE CLASS MANAGEMENT REGISTER
27c
NUMBER-OF-SERVICES-HAVING REMAINING-CLASSES REGISTER
27d
PREVIOUS SERVICE FLOW MANAGEMENT REGISTER
26c
NUMBER-OF-SERVICES-HAVING REMAINING-FLOWS REGISTER
26d
CLASS PRIORITY MANAGEMENT REGISTER
24e
MOST EXCESSIVE CLASS EXCESSIVELY USED VOLUME REGISTER
R13
MOST EXCESSIVE FLOW EXCESSIVELY USED VOLUME REGISTER
R14
t
t14

Fig.47 PRIOR ART

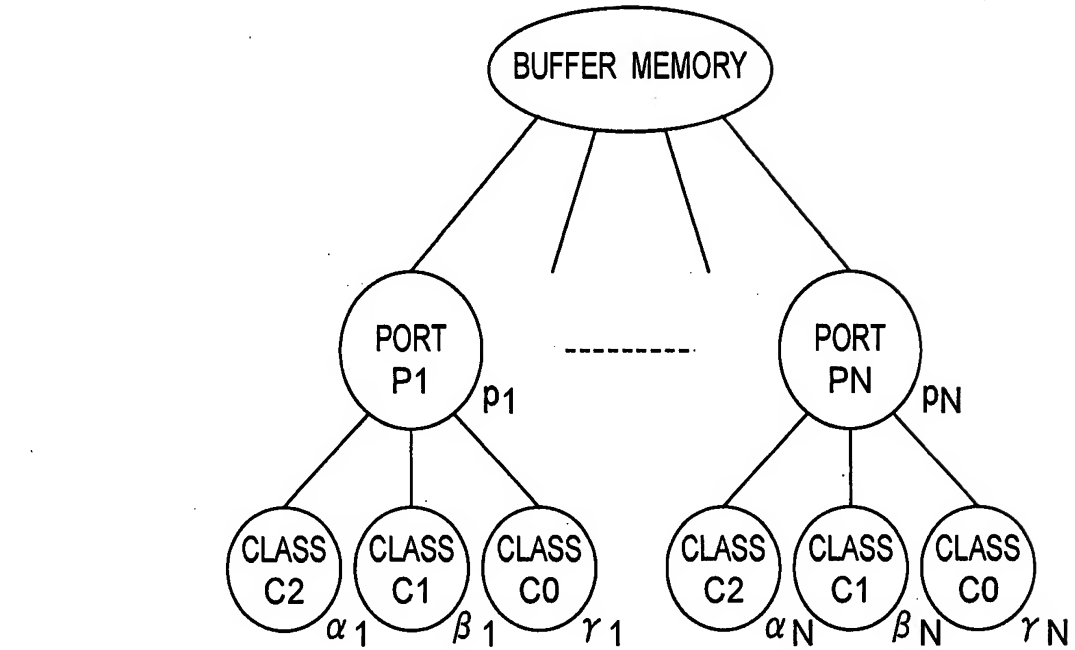

Fig.48A PRIOR ART

WHEN PORT P1 USES STORAGE AREA OF BUFFER MEMORY LARGER THAN BASIC VOLUME, CLASS C3 OF ARRIVED PACKET USES STORAGE AREA WITHIN BASIC VOLUME RANGE AND CLASS C2 OF ARRIVED PACKET USES STORAGE AREA LARGER THAN BASIC VOLUME

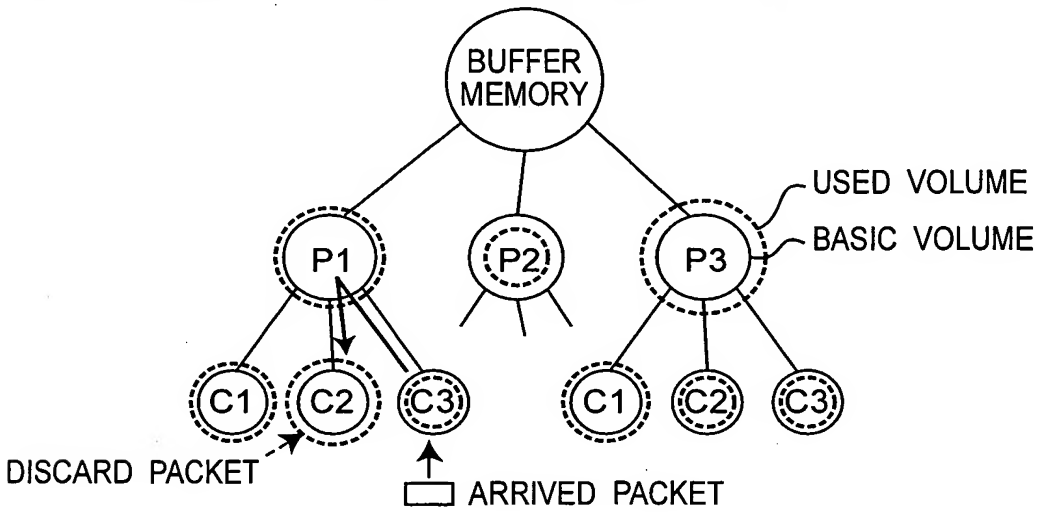

Fig.48B PRIOR ART

WHEN CLASS C3 OF ARRIVED PACKET AND PORT P1 USE STORAGE AREA OF BUFFER MEMORY WITHIN BASIC VOLUME RANGE, AND PORT P3 AND CLASS C1 OF PORT P3 USE STORAGE AREA LARGER THAN BASIC VOLUME

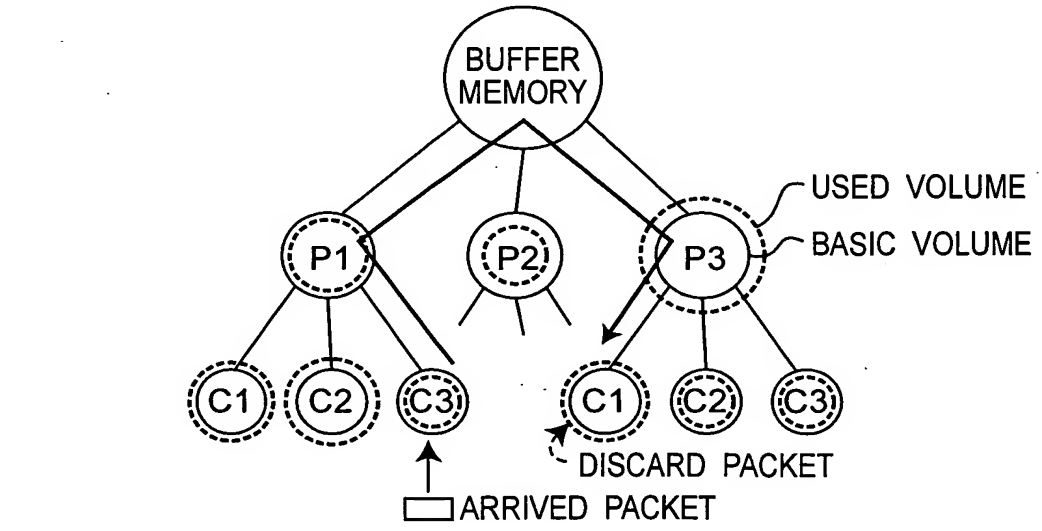
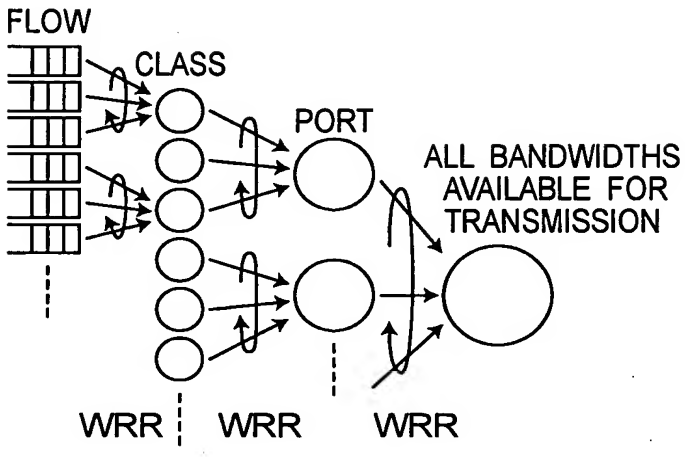
Fig.49 PRIOR ART